EXCAVATING ENGINEER

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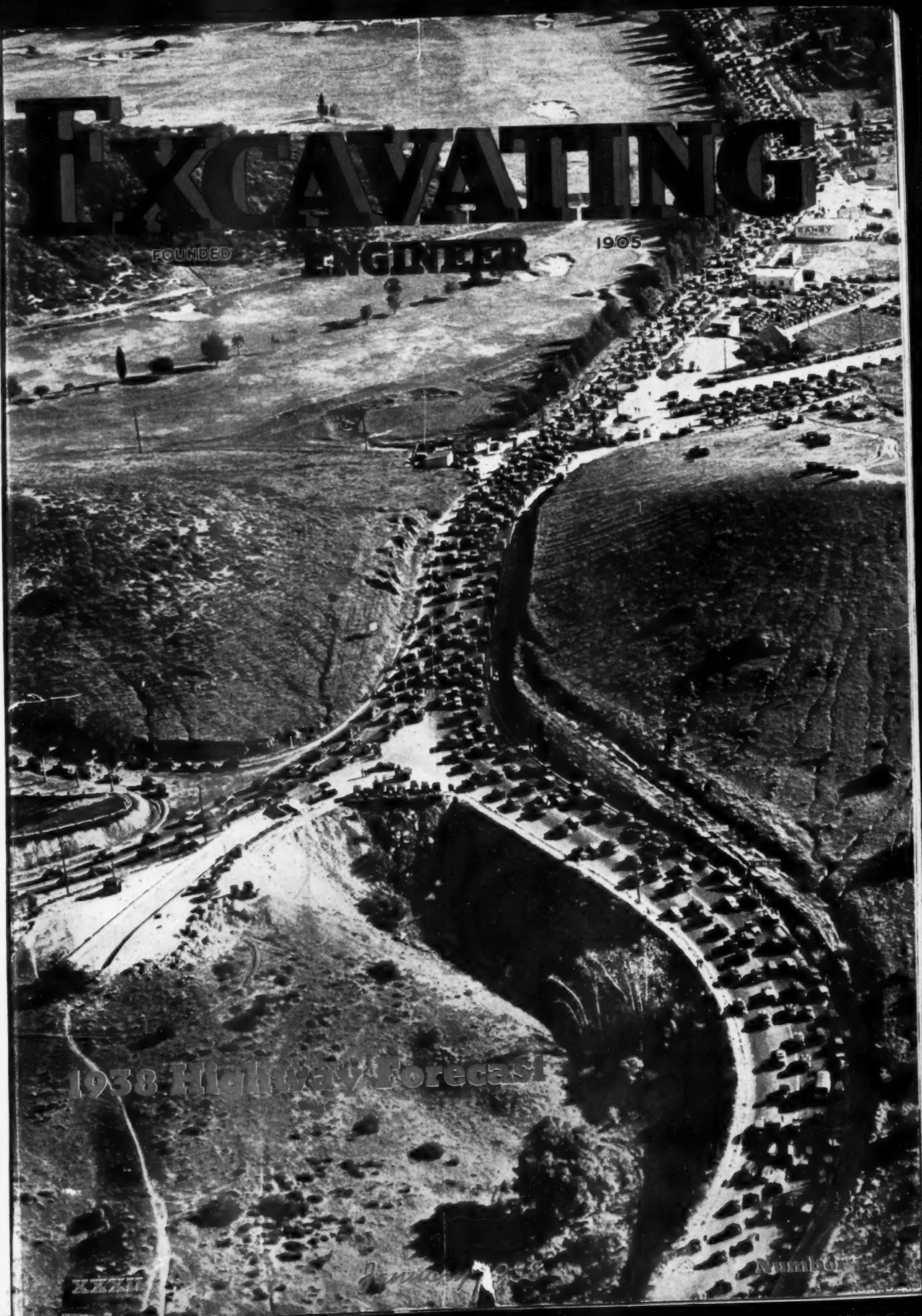
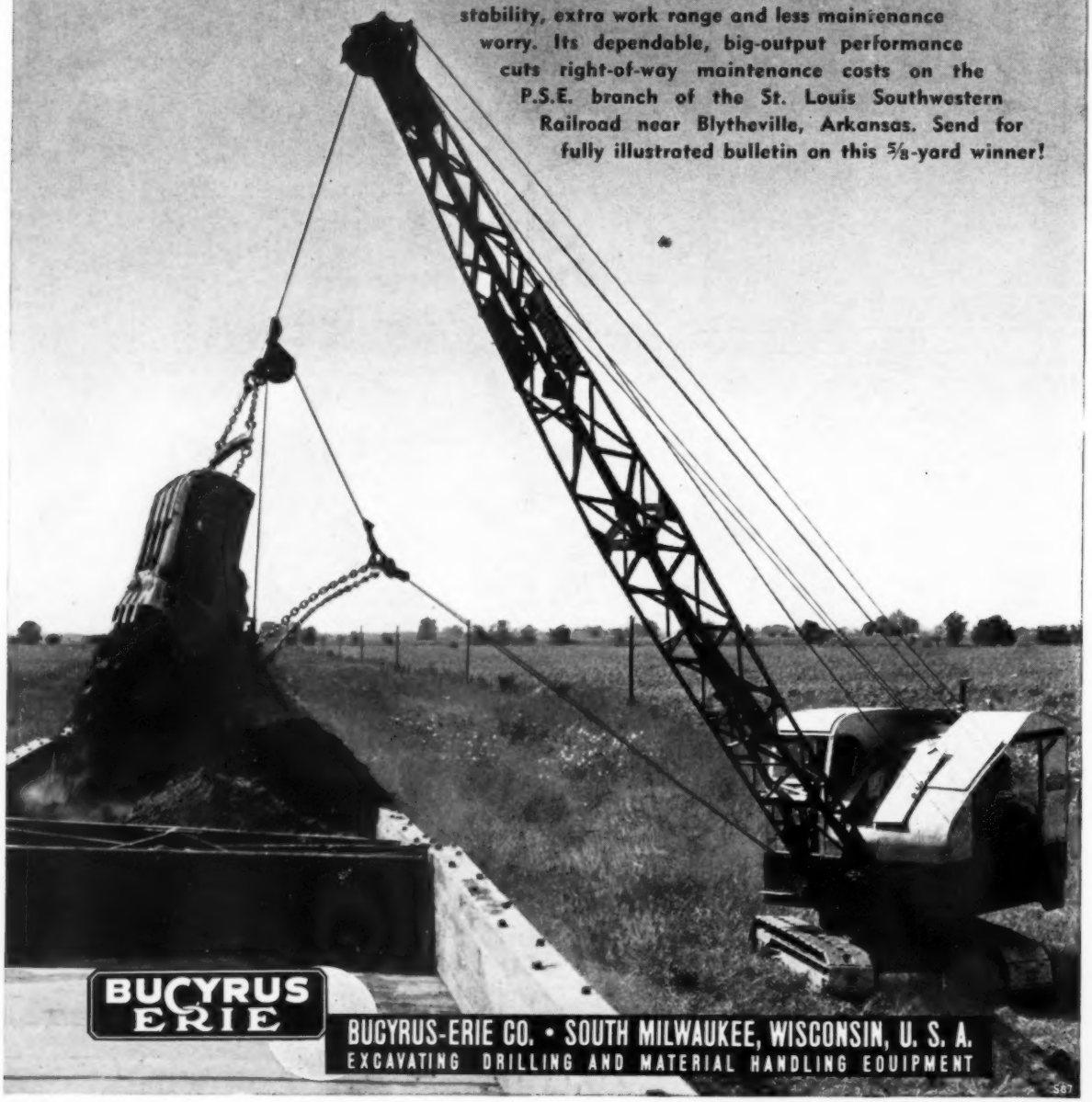


1938 Highway Forecast

XXXII January 1938 Number 1

BUCYRUS-ERIE

LARGE CONICAL HOOK ROLLERS operating between a double roller-path in the tough cast steel truck frame, take the tipping loads as this husky 5/8-yard dragline piles the dirt into the long line of dump cars. With center pintle eliminated, this mobile, easy-operating excavator offers extra stability, extra work range and less maintenance worry. Its dependable, big-output performance cuts right-of-way maintenance costs on the P.S.E. branch of the St. Louis Southwestern Railroad near Blytheville, Arkansas. Send for fully illustrated bulletin on this 5/8-yard winner!



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EXCAVATING DRILLING AND MATERIAL HANDLING EQUIPMENT

S87

EXCAVATING

FOUNDED ENGINEER 1905

contents

Vol. XXXII **January, 1938** No. 1

Traffic! ..... **Front Cover**
A record crowd toots its way to the annual Rose Bowl football game in Pasadena.

Highway Forecast for 1938 ..... **14**

Alabama	17	Iowa	21	Nebraska	65	Rhode Island	69
Arizona	17	Kansas	23	Nevada	65	South Carolina	69
Arkansas	17	Kentucky	23	New Hampshire	65	South Dakota	70
California	17	Louisiana	23	New Jersey	65	Tennessee	70
Colorado	18	Maine	23	New Mexico	66	Texas	72
Connecticut	18	Maryland	25	New York	66	Utah	72
Delaware	18	Massachusetts	25	North Dakota	68	Vermont	72
Florida	19	Michigan	25	North Carolina	68	Virginia	72
Georgia	19	Minnesota	62	Ohio	68	Washington	73
Idaho	19	Mississippi	62	Oklahoma	68	West Virginia	73
Illinois	21	Missouri	63	Oregon	69	Wisconsin	73
Indiana	21	Montana	63	Pennsylvania	69	Wyoming	73

Modern Highway Building **26**

Pan American Highway — By Ralph Hancock **28**
El Salvador finds modern equipment speeds work on its section of international road.

Spending Other People's Money — By B. C. Heacock **32**
A timely editorial by the President of Caterpillar Tractor Company.

Louisiana Overpass **35**
Wm. F. Rodgers use 3½-yard scrapers in building overpass approaches.

Cartoon and Comedy ..... **34 and 60**
Ex-Laffs ..... 34 Not In the Contract 60

Editorial **36**
Safety Trends ..... 36 The Coming Highway Year .. 37

Equipment You Ought to Know About **38**

Portable Hydraulic Press	38	New Haiss Units	39	IR Wagon Drill	40
Truck-Mounted Shovel	38	Highway Widener	39	Heavy Duty Digger-Loader	44
Utility Compressor	38	New Gasoline Engines	39	Electric Generator	44
Torches	38	Caryall Scraper	39	Portable Welder	44
Diesel Battery	38	Air Line Anti-Freeze	40	Steel Decking	44
Pressed Steel Frame Pumps	39	Portable Power Plant	40	John Utility Trailer	44
Engine-Driven Welder	39	FWD Truck	40	Arc-Welding Electrode	44
Four-Cylinder Diesel	39				

The Grading Gang Goes to Town — By Bob Belt **46**
A highway builders' poem.

Shots From the Firing Line **48**

Interior Construction Co. Low Bidder on Grand Coulee	48	International Harvester Expansion	52	Bids for Tionesta Dam	56
All Roads Lead to Cleveland	50	Security Tax Report Changes	52	Schramm Expansion	56
N.A. Highway Officials Meet	50	Crooked Creek Dam Bids	54	Reclamation in 1937	56
WPA Highway Work	50	Gatke Expands	54	Safety Competition Winners	58
Second Largest Concrete Dam	50	National Paving Brick Meeting	54	Trailer Firm Moves	58

Book Reviews **74**

Trade Notes **76**

LOOKING AHEAD

These interesting articles will appear in an early issue of EXCAVATING engineer. Watch for them.

For 1938

These articles are scheduled for early issues: Gasoline Tractor Lubrication; Early Gold Dredging; New Coal Stripping at St. David, Illinois; Winding Up at All-American Canal. Roadbuilding, cellar digging, airport construction articles are also on tap. Be sure you get your copy every month.

Limestone

Herzog Lime & Stone Company uses 3-yard electric shovel in loading to small, speedy trucks which cut hauling costs.

Published Monthly by THE EXCAVATING ENGINEER PUBLISHING COMPANY, South Milwaukee, Wisconsin, U.S.A.

E. O. WYSS, Manager — D. E. REED, JR., Associate Editor — ARNOLD ANDREWS, Editor — RALPH H. DIEHL, Associate Editor — JOHN I. MORAVEC, Art Director — DELMAR STOKEN, Associate Editor — E. H. GELSTON, Advertising Manager

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ENTERED AS 2nd CLASS MATTER BY THE EXCAVATING ENGINEER PUBLISHING COMPANY, [illegible]

Atlas Diesels "fill the bill" for "Uninterrupted Supply of Power"

SAXTON, LOONEY & RISLEY

October 12, 1937

Mr. C.R. Bjorge, Manager
Clyde Equipment Co.
Portland, Oregon

Dear Sir:

Just a note to tell you about our job at Crater Lake, Oregon just completed.

As you will recall this was a hurry-up job awarded late in the season by the Bureau of Public Roads and called for approximately 19,000 Tons of crushed rock of which 8,000 Tons was 3/4" minus requiring 40% to pass a No. 10 sieve.

To insure an uninterrupted supply of power we elected to use our two 80H.P. Atlas-Imperial Diesels and they never failed us although working at 6,800 ft. elevation.

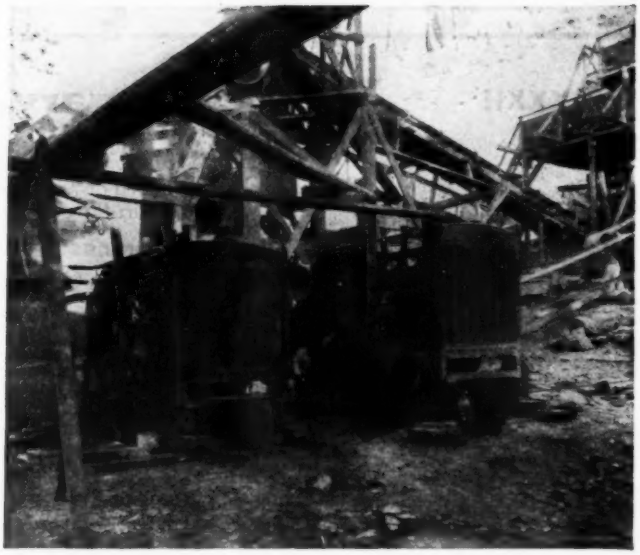
The crushing of this rock required approximately forty days time with these same two diesels which were purchased from you in 1930.

Very truly yours,

SAXTON, LOONEY & RISLEY

by J.S. Risley

P.S. We are now moving the Atlas-Imperials over to Eagle Point where we are to run out about 11,000 cubic yards for the State of Oregon.



Two 80 H.P. Atlas Imperial Power Units used by Saxton, Looney & Risley in building highways in Crater Lake National Park in Oregon.

When road builders are constructing highways in the mountain states where contract requirements or nature puts a time limit on the job—an uninterrupted supply of power at the rock crusher is highly important.

Sometimes there is no other alternative than to use Diesel power, at other times they still prefer Diesel power even when the project is located on the highlines. With Atlas Diesels driving a crusher direct or through motor drives, there is no interruption of operations due to transmission line difficulties from forest fires, wind or electrical storms, sleet and ice.

Perched on a mountain side, this picture shows the feed end of Saxton, Looney & Risley rock crusher.

ATLAS IMPERIAL DIESEL ENGINE COMPANY

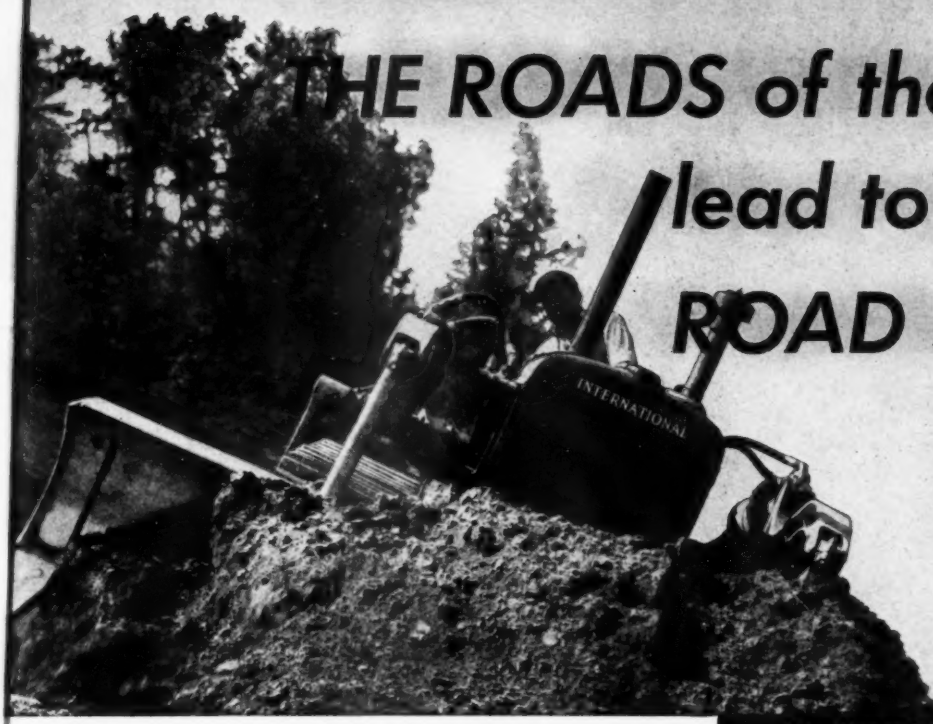
Oakland, California — Mattoon, Illinois

ATLAS IMPERIAL

EXCAVATING engineer

For your convenience in writing to Atlas Imperial Diesel Engine Co., you will find a card bound in this issue.

THE ROADS of the WORLD lead to the ROAD SHOW...



Above: There are five International TracTracTors, including two with Diesel engines. The powerful Model TD-40 Diesel shown here.

Let INTERNATIONAL HARVESTER POINT THE WAY

Another two-year period of road-building activity gets under way with the American Road Builders Association meeting and National Road Show at Cleveland. *New plans, new projects, new methods,* and *new equipment* are to the front today. International Harvester moves forward with this great industry, constantly building improvements into its line of industrial tractors, power units, and motor trucks so that *more work is accomplished at lower costs* by the men who build and maintain the roads of the world.

At the Five-Star Highway Exposition of the American Road Builders Association, *International TracTracTors, Wheel Tractors, Power Units,* and *International Trucks* will be on display in Harvester's own exhibit, "The International Highway." And throughout the great arena you will see scores of manufacturers exhibiting equipment designed for operation with International Harvester products.

Visit our exhibit at the Road Show and investigate the International line thoroughly. Also ask our nearby Company-owned branch or dealer for complete details.

Right: International's "coppettes" will be on hand at the Road Show to guide you through "The International Highway."

Above: Today there is a new line of International Trucks, Half-Ton to powerful Six-Wheelers.

Above: International Diesel engine available for wheel-tractor operation in this Model ID-40.

Above: The International I-12 Industrial Tractor powers this maintainer.

INTERNATIONAL HARVESTER COMPANY
(INCORPORATED)
180 NORTH MICHIGAN AVENUE CHICAGO, ILLINOIS

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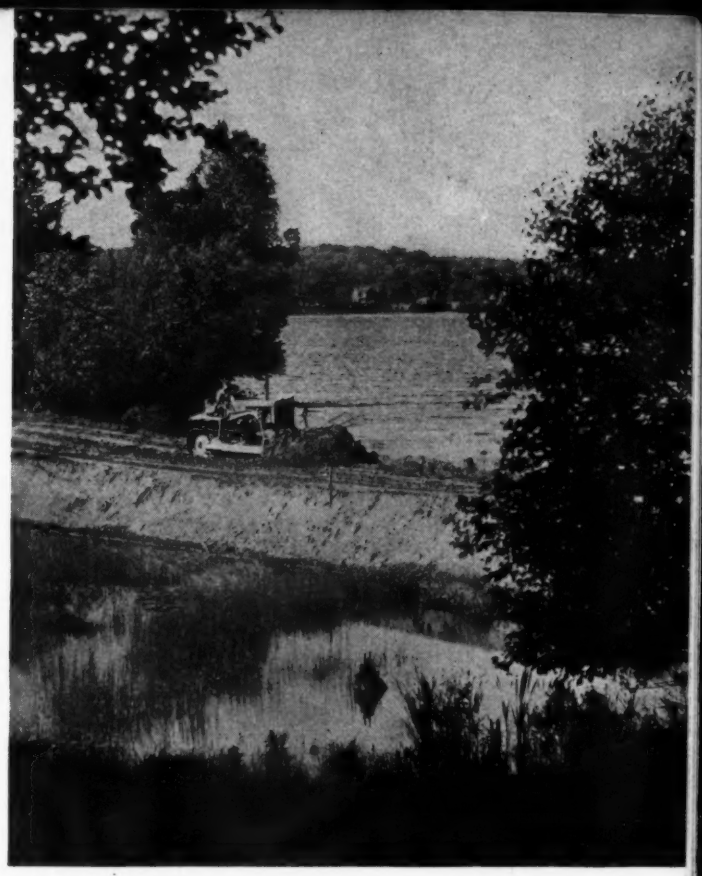


Will Congress Slash Road Funds? With Authorized Federal Allocations, 1938 Looks Like a Billion-Dollar Highway Year . . . Built-in Safety, Continued Anti-Diversion Efforts, and Farm-to-Market Program Will Feature the Coming Year.

● Raynor Construction Company of Leaside, Ontario, has this scenic roadbuilding job near Baysville, Ontario. They are using an International TD-40 TracTracTor with Bucyrus-Erie Bullgrader for the leveling.

AS THIS is written, the big IF standing like a hurdle in the way of a billion-dollar state highway year is the acceptance or refusal by Congress of the President's recommended $116,500,000 reduction in 1939 Federal highway allocations. That recommendation also asks that future funds be slashed to "pre-depression" levels. Congress, in the Hayden-Cartwright Act, has already gone on record as strongly opposing diversion; consistency demands that this invitation to "penny-wise, pound-foolish" economizing be turned down.

● The unusual blasting picture on the opposite page was taken on a James Spencer & Son road job near Laurel, Mississippi. Explosives were used to liquify and partly excavate muck and surface "mat" from right-of-way. This shot was a 100-foot section with holes from 2½ to 3 feet deep, on 18-inch centers, in 5 rows 5 feet apart. Each hole was loaded with three 1¼- by 8-inch cartridges of Hercules 50 per cent L. F. N. G. dynamite. The shot made a trench 30 feet wide and 4 feet deep.

The plain fact is that, since the first Federal Highway Act in 1916, highway taxes have yielded the government at Washington over $100,000,000 more than the government has allocated back to highways.

Equally plain is the strong probability that the Presidential recommendation was made with the political purpose of putting Congress on the spot. If Congress declines to take this "economy" measure, the President can "point with indignation" when any attempt is made to force him to cut spending which may be far less economically sound.

With over 28,000,000 motor vehicles using our highways in 1937 and a larger total indicated for 1938; with traffic accidents costing 40,000 lives and untold money in 1937; with early results from scientific accident and traffic studies showing the accident-reducing possibilities of street and highway modernization, it is increasingly evident that any reduction in funds available for highway development is tragically unsound. Today, we are paying, in dead and damages, because much of our highway system is antiquated and inadequate.

This is no time for diversion—state or federal! And our highways never will be a fit subject for a political checker game.

At a time when the unemployment problem is tremendously pressing, despite an era of "end depression" panaceas, highway building is a particularly sound investment. It is an economic axiom that sound spending starts a chain of prosperity. According to a U. S. Bureau of Roads study, $1.00 spent in highways results in the distribution of $3.15 in wages

● The old and the new. This Spence Air Photo shows Conejo grade, looking west in Ventura County, California. Highway cut-off, eliminating curves and two sides of a triangle is plainly visible.

and trade in 24 industries. Further, when the highways are built, they are a usable, dividend-paying national asset. Excavating Engineer is strongly in favor of economy and balancing the national budget. But the economizing should come in the unproductive fields; top-heavy bureaucracy, and leaf-raking, shovel-leaning projects which do the country no good once they have been accomplished. We, as citizens, should emphatically demand that our government buy something useful with the money we give it to spend.

Aside from the burning question of diversion, political, just plain money-grabbing, or otherwise, the significant factors in the 1938 highway situation are not new, but developments of trends already begun in 1937 or earlier.

We believe 1938 will show an increased use of traffic studies to serve as a basis for highway planning. New roads, whether they be improved dirt or $600,000-a-mile super-highways will be built with foreknowledge of their adequacy to serve the traffic that will use them. Main highways, more and more, will be designed as high-speed roads. Routing to avoid cities, divided lanes, elimination of railroad and highway crossings, wide rights-of-way, and curve reduction will be main features of principal roads. Also, new highways which do not at present justify super-highway expense will be built so as to permit easy expansion to the super-highway class at a later date.

Secondary, or farm-to-market roads will continue to receive emphasis, with increased efficiency of equipment and technical improvements in low-cost, non-skid surfacing enabling the road dollar to buy more.

Public sentiment against diversion and for safety—not only in the physical characteristics of highways, but in their use as well, will be increasingly important.

To us, 1938 looks like an outstanding highway year.

The cost of maintaining the nation's highways grows apace. It is one of the largest "upkeep" items confronting the country's car owners. Right now, it is estimated, motorists are paying out $400,000,000 yearly to keep the highway system at its present state of efficiency. It is one of the most powerful arguments used against diversion of automobile and gasoline tax revenues.

One-sixth of all the money gathered in taxes by all local, state and federal units of government is obtained through levies upon ownership and use of motor vehicles.

This was revealed upon completion of a twelve-month study of taxation in the automotive field by the National Highway Users Conference. The study, based largely upon governmental figures, is believed to be the most extensive and authoritative of its type ever undertaken.

Motor vehicle owners and users bear a total "ultimate consumer" burden of at least $1,750,000,000 in levies placed annually upon automotive transportation in all its phases, the Conference reports. Annual tax receipts of all governmental units are estimated at $10,200,000,000.

Forecasts by States

State forecasts must depend somewhat this year on whether or not Federal Aid is reduced. These forecasts are presented on the basis of Federal funds being allocated as authorized.

Alabama

The Alabama State Highway Commission believes that the 1938 highway program should increase highway activities within the State should State and Federal funds as anticipated become actualities.

It has been estimated that the program should be approximately as follows:

Construction	$16,190,000.00
Maintenance	2,400,000.00
Fixed Charges and Other	5,382,000.00
Or a total of	$23,972,000.00

This total figure is some forty odd per cent increase over the 1937 program.

The funds from which the program will be financed are estimated as follows:

Federal Funds	$11,186,000.00
County Participation	2,000,000.00
Sale of Gasoline Excise Tax Warrants	1,250,000.00
State Funds from the Gasoline Tax	6,500,000.00
State Funds from Vehicle License Fees and other	3,036,000.00
	$23,972,000.00

Reviewing the activities of the Alabama State Highway Commission for 1937, a part of this forecast may be interesting to engineers, contractors, highway commissions, and highway users. The sources of revenue for the State Highway Department covering its various activities include the following general items:

(1) One-half of general six cent gasoline tax
(2) Portions of automobile license fee revenues
(3) Motor bus and carrier fees
(4) County participation
(5) Federal participation, including WPA
(6) Miscellaneous (about .4 per cent)

Thus, the Alabama State Highway Department for the year 1937 had the following construction programs operating:

Federal Program	$5,000,000.00
State and County Program	1,500,000.00
State, County and WPA Program	1,000,000.00
State Program	2,000,000.00
A total of	$9,500,000.00

The total disbursements of the Alabama State Highway Department for its fiscal year ending September 30, 1937 (including all items—fixed charges, construction, maintenance, equipment, administration, supervision, and miscellaneous) were $15,337,829.22.

During the past fiscal year, ending September 30, 1937, the Alabama Highway Commission completed approximately 500 miles of highway construction, including concrete pavement, bituminous pavement, sand clay, chert, gravel, and graded and drained construction work.

At the present date there are over 650 miles of construction work now in progress in Alabama. Over 350 miles of this work consist of pavement.

The 1938 program will, in general, consist of pavements, reconstruction and relocation of the various highways. Most assuredly with such a program of reconstruction, relocation, and pavement, there will be considerable excavation work awarded.

Arizona

The 1938 highway budget in Arizona will total $7,288,613 according to preliminary estimates. The construction program will amount to $4,288,613; maintenance will total $1,850,000; and other costs, $1,150,000.

The Hayden-Cartwright Act will furnish $2,510,536; other Federal funds, $378,077; state gas tax, $3,300,000; and vehicle license fees and other state sources, $1,100,000.

In 1937 no highway funds were diverted in Arizona.

1938 construction plans call for 65 miles of grading, $2,000,000; 125 miles of gravel and crushed stone surfacing and oil treatment, $1,188,613; 10 miles of high type paving, $300,000; and 4 bridges and grade separation projects, $800,000. These figures include previously awarded excavation carried over into 1938.

Arkansas

EXCAVATING ENGINEER ARRANGEMENTS NOT YET PERFECTED FOR 1938 CALENDAR YEAR CONSTRUCTION PROGRAM IN ARKANSAS. ANTICIPATED THAT POSSIBLY PLANS WILL BE CONSUMMATED DURING NEXT 90 DAY PERIOD TO TAKE FULL ADVANTAGE OF 1937 AND 1938 FISCAL YEARS FEDERAL FUNDS AVAILABLE AMOUNTING APPROXIMATELY FOUR AND ONE QUARTER MILLION DOLLARS

W W ZASS, CHIEF ENGR.

California

The highway budget of California is prepared upon a biennial basis of two fiscal years, and as July 1, 1937 was the beginning of a budgetary biennium, it is difficult to accurately forecast the work to be accomplished during the 1938 calendar year.

It is anticipated by the California Division of Highways, however, that a total expenditure

● This picturesque cut is for a modern 4-lane, 8.4 mile divided highway between San Francisco Bay and Central Valley. Contractor is Granfield, Farrar & Carlin. The LeTourneau U-20 scrapers, drawn by Caterpillar RO8s, handled 117 yards per hour on a 1700-foot round-trip haul.

of more than $33,000,000 will be made in 1938. $25,000,000 will be used on construction and $8,000,000 for maintenance. This amount is about 5 per cent less than 1937 expenditures.

Funds will be derived from the following sources: $25,400,000 from the Division of Highways share of the three-cent gas tax; $3,100,000 from the Division's share of vehicle license fees; and about $4,500,000 from Federal funds.

The gas tax in California is divided between the state, counties and cities, and vehicle license fees are divided between the state and counties. There was no highway diversion in California; all highway funds were used for highway purposes.

Construction funds in the amount of $10,176,000 will be used for grading and low and intermediate type surfacing on about 225 miles of state highway; $8,000,000 for 135 miles of high type surfacing and $3,870,000 for bridges and grade separations. Federal feeder road projects involving all classes of construction will require about $2,900,000.

Colorado

A total of $15,350,000 will be available for highways in Colorado in 1938, according to Public Relations Director W. M. Williams. This represents a decrease of about 30 per cent from 1937 funds. Construction for 1938 will cost an estimated $12,500,000; maintenance will take $1,600,000; and oil surfacing $1,250,000.

Hayden-Cartwright funds will furnish $2,000,000 of the above; state gas tax, $5,000,000; and vehicle license fees, $1,250,000. In 1936, Colorado issued $25,000,000 of anticipation warrants for highways. The balance of this fund will be spent in 1938, together with a carry-over from other funds amounting to about $7,250,000.

500 miles of grading and gravel surfacing are planned for 1938. This, with construction of 145 bridges will absorb the $12,500,000 allotted for construction. The oil surfacing mentioned above will be given to 700 miles of road. Previously awarded excavation costing $4,100,000 will be carried over into 1938.

Colorado had no diversion in 1937.

Connecticut

An increase of 9 per cent in highway funds available for 1938 is anticipated by the State Highway Department. Including receipts from bonds for Merritt Parkway and Middletown-Portland Bridge, a total of about $24,000,000 for highway use is estimated. $14,700,000 of this will be used for construction; $5,000,000 for maintenance; and $4,250,000 for other purposes.

Federal Funds for Connecticut are expected to total $2,500,000. Gas tax receipts are estimated at $9,000,000, and revenues from vehicle license fees, etc., at $12,500,000.

Construction funds for 1938 use will be divided about as follows: 15 miles of grading (including R.O.W.), $4,100,000; 125 miles of gravel and crushed stone surfacing, $1,250,000; 70 miles of high type paving, $4,200,000; 70 miles of low type paving, $3,150,000; and 40 bridges at a cost of $2,000,000.

500,000 yards of previously awarded excavation will be carried into 1938, and a preliminary check of unexpended contracts still incompleted shows a balance of approximately $3,500,000.

No diversion of 1937 highway funds is reported for Connecticut.

Delaware

An increase of 100 per cent in construction funds gives Delaware $2,000,000 for construction purposes in 1938 according to Samuel Knopf, Principal Assistant Engineer. Maintenance allocations remain the same as in 1937, $900,000.

Funds will be derived from the following sources: Regular Federal Aid, $609,375; Secondary Road fund, $125,000; crossing elimination, $250,000; state gas tax, $2,100,000; and vehicle license fees and other, $1,100,000.

Division of the construction budget is planned as follows: 20 miles of widening concrete roads,

More than 22,000 miles of all classes of highway were brought to completion in the fiscal year 1937, according to annual report of the Bureau of Public Roads. This mileage, completed under Bureau supervision, exceeded by several hundred miles the work completed in the previous year and also the record of 21,700 miles completed in 1934.

Grade-crossing elimination and protection work in 1937 far surpassed that of any other year. There were 1,149 crossings eliminated, of which 1,086 were financed under the $200,000,000 grade-crossing program authorized by the Emergency Relief Appropriation Act of 1935. Also, 196 existing grade-separation structures were reconstructed and 574 crossings were protected by signals or other safety devices.

● Hart County, Georgia, construction and maintenance units are these two streamlined Cletracs pulling 5-yard Austin-Western scrapers.

$200,000; 40 miles of gravel or crushed stone surfacing requiring 25,000 yards of material, $240,000; 100 miles of oil treatment, $100,000; 15 miles of high type paving, $750,000; 30 miles of low type paving, $300,000; and 2 bridges, $300,000. Grading on all of the above work will amount to 250,000 yards. No previously awarded excavation remains to be carried into 1938.

Florida

About the same highway funds are expected for 1938 as Florida had for 1937, according to Assistant Highway Engineer John R. Slade. Total money available will be about $11,043,000. Of this, $7,156,000 will be used for construction, $3,300,000 for maintenance, and $587,000 for other purposes.

Federal funds are expected to provide $2,293,000; and the state gas tax, $8,750,000.

Florida reports no diversion for 1937. Highway excavation awarded in 1937 and carried over into 1938 will total $1,281,000.

● Paving on this South Carolina state highway job is handled with a Ransome 27-E hydraulic control, dual drum paver. Contractor is Wm. F. Bowe, Jr., of Augusta, Georgia.

Georgia

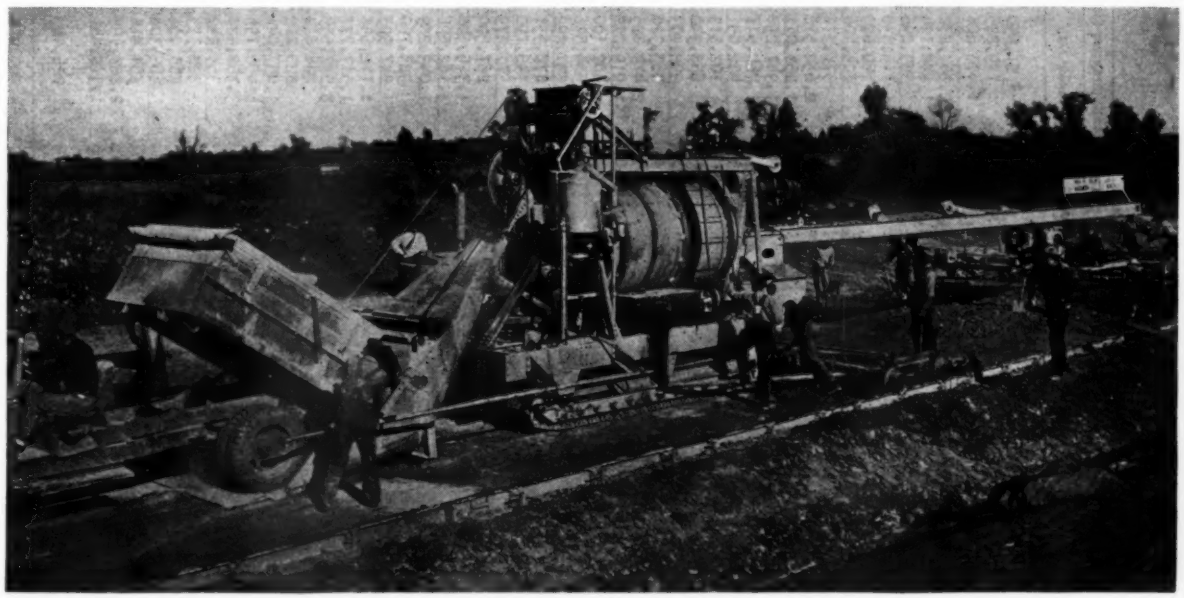
The Georgia highway appropriation runs from June 1937 to June 1938. For that period, a total of $32,000,000 in Federal funds and state gas tax receipts is available for all projects, including WPA grade crossing eliminations. About $12,000,000 of this has already been let, leaving $20,000,000 available for use between now and June. In addition, gas tax receipts for the first six months of 1938 will be available. In 1937 total gas tax receipts were about $19,000,000 of which two-thirds is available for highways. It is estimated that 1938 receipts will be about the same.

Also available for 1938 use will be Georgia's share of Federal Aid appropriations.

Idaho

Approximately the same total as in 1937, $7,000,000, will be appropriated for highway work in Idaho in 1938, with construction amounting to $4,560,000; maintenance, $1,600,000; and other work, $840,000.

Sources of Federal funds are: Federal Aid, $1,842,000; Federal Lands, $132,000; grade separa-



FEDERAL-AID HIGHWAY PROJECTS

AS OF OCTOBER 31, 1937

STATE	COMPLETED DURING CURRENT FISCAL YEAR			UNDER CONSTRUCTION			APPROVED FOR CONSTRUCTION			BALANCE OF FUNDS AVAILABLE FOR NEW PROJECTS
	Estimated Total Cost	Federal Aid	Miles	Estimated Total Cost	Federal Aid	Miles	Estimated Total Cost	Federal Aid	Miles	
Alabama	$ 163,700	$ 81,850	5.9	$ 2,557,661	$ 1,268,830	121.7	$ 3,108,900	$ 1,554,445	146.0	$ 4,942,055
Arizona	981,784	719,225	31.5	1,554,193	1,102,579	80.9	424,143	286,934	18.1	1,205,611
Arkansas	1,476,347	1,475,608	72.8	2,462,294	2,456,914	183.6	264,896	264,568	13.4	2,201,829
California	4,471,220	2,367,272	98.1	5,945,358	3,239,392	97.7	3,319,836	1,749,868	64.2	1,554,575
Colorado	2,234,049	1,248,194	87.4	1,260,853	696,448	33.9	494,404	260,018	16.0	2,166,805
Connecticut	710,998	353,096	8.7	231,110	107,923	1.3	72,610	36,300	.2	1,513,584
Delaware	231,150	115,530	5.8	281,162	140,537	13.7	243,905	119,934	14.8	1,107,687
Florida	301,250	150,620	8.2	2,716,172	1,358,086	65.2	508,170	254,085	7.8	2,648,148
Georgia	1,415,614	704,406	82.6	4,097,392	2,048,691	185.6	2,283,426	1,141,713	93.9	4,725,214
Idaho	1,639,071	975,378	140.6	1,271,274	759,487	78.3	194,020	115,570	20.3	1,112,436
Illinois	5,382,529	2,632,516	154.2	8,400,961	4,200,023	254.4	4,042,000	2,017,150	73.9	2,122,313
Indiana	2,527,473	1,258,071	53.3	5,091,782	2,545,770	148.9	1,206,198	603,099	24.4	2,120,799
Iowa	4,215,696	1,947,238	134.3	6,443,476	2,838,943	194.3	1,049,492	481,550	33.9	819,557
Kansas	2,575,957	1,260,617	146.6	3,694,085	1,846,943	125.7	1,900,812	949,133	98.1	3,276,079
Kentucky	904,102	452,051	25.6	3,914,808	1,907,404	115.2	1,845,164	922,582	88.0	2,401,247
Louisiana	213,312	102,519	5.9	6,724,240	1,514,885	48.6	5,293,838	836,455	12.5	1,729,722
Maine	1,316,680	658,340	34.7	2,143,566	1,071,783	52.7	690,599	345,295	16.3	203,604
Maryland	184,006	92,003	2.1	2,236,200	1,101,517	36.5	435,318	215,909	3.7	1,685,379
Massachusetts	926,641	463,320	7.3	4,039,654	2,019,826	15.2	1,484,726	742,363	.7	1,862,823
Michigan	4,829,650	2,414,825	126.1	5,882,030	2,941,515	145.4	2,417,309	1,133,829	37.3	228,478
Minnesota	3,861,230	1,919,018	175.3	3,782,371	1,879,941	164.3	1,528,426	628,328	59.6	1,741,332
Mississippi	804,200	402,100	40.0	4,696,100	2,347,730	216.5	1,362,200	680,050	58.3	3,203,296
Missouri	5,213,011	2,584,546	291.1	6,727,386	3,177,780	240.6	3,409,293	1,391,107	84.8	1,659,385
Montana	3,278,293	1,837,892	225.6	2,031,335	1,111,716	112.3	255,860	143,920	7.9	2,347,702
Nebraska	1,757,862	878,931	169.2	4,807,736	2,391,846	465.8	2,359,810	549,905	64.6	2,311,049
Nevada	1,333,105	1,146,790	74.9	1,454,212	1,255,676	61.5	328,489	284,859	36.5	682,069
New Hampshire	143,483	71,379	1.9	595,203	293,799	11.2	56,074	27,911	.6	1,039,780
New Jersey	689,590	267,500	5.7	1,808,138	903,749	16.5	124,870	62,435	.6	2,247,469
New Mexico	2,141,540	1,315,548	169.9	2,447,626	1,592,186	125.0	792,104	483,101	35.7	254,189
New York	6,833,274	3,162,558	119.4	17,878,354	8,498,916	300.5	3,583,890	1,790,445	49.3	565,736
North Carolina	2,086,699	1,043,289	163.1	6,076,383	2,825,491	300.2	1,592,280	697,390	61.3	2,538,696
North Dakota	925,760	925,760	173.4	1,281,430	1,260,920	90.5	236,822	236,822	36.4	3,298,731
Ohio	1,796,762	847,903	24.5	10,191,439	5,046,014	112.2	2,020,460	1,010,230	25.8	5,183,848
Oklahoma	2,119,328	1,112,698	90.7	2,829,097	1,464,273	118.5	1,859,295	976,663	82.1	3,123,267
Oregon	2,599,477	1,517,777	111.1	2,172,633	1,325,099	60.1	648,679	395,770	30.5	1,045,089
Pennsylvania	7,093,759	3,527,559	106.9	9,094,345	4,527,953	120.0	4,238,870	2,109,206	67.5	2,703,665
Rhode Island	536,250	266,814	5.7	1,097,274	548,637	13.7	257,230	128,615	1.7	760,655
South Carolina	1,927,691	820,202	167.2	5,068,911	2,049,055	229.7	1,694,090	630,135	71.1	1,357,311
South Dakota	1,853,022	1,057,041	148.0	1,905,350	1,053,580	214.0	549,730	303,940	83.5	3,132,700
Tennessee	932,278	459,194	42.7	1,539,764	769,882	41.5	803,300	401,650	29.5	4,888,945
Texas	6,730,726	3,362,428	486.9	10,373,623	5,168,332	525.0	3,988,591	1,945,434	183.6	5,862,276
Utah	491,434	353,242	44.6	1,445,090	1,030,780	130.1	154,270	108,800	8.5	1,096,863
Vermont	664,181	322,733	18.1	1,594,810	719,760	43.3	302,650	127,954	5.5	82,385
Virginia	1,736,001	868,001	90.6	2,829,382	1,375,276	78.6	1,151,502	551,316	40.2	2,125,909
Washington	1,266,828	665,300	62.1	2,871,529	1,500,679	44.9	1,007,410	527,225	8.9	796,634
West Virginia	708,835	354,418	20.5	1,466,674	736,830	42.7	628,902	464,851	18.1	2,136,392
Wisconsin	6,140,018	2,888,797	202.9	5,150,820	2,519,820	136.4	775,055	384,600	31.4	1,309,076
Wyoming	2,154,791	1,318,461	203.9	1,426,942	863,629	189.9	246,250	152,160	12.4	218,942
District of Columbia										
Hawaii	459,087	226,420	8.0	504,649	248,452	9.9	449,816	205,089	6.9	1,148,247
Puerto Rico				53,980	26,990	2.1	648,039	322,040	12.6	275,970
TOTALS	104,979,744	54,999,978	4,675.6	186,150,857	93,682,287	6,216.3	68,334,023	31,752,751	1,998.9	98,765,553

● Brand & Deal of Elkhart, Indiana, produce road gravel with this Pioneer crushing, screening and loading plant. A new Whitley County Diamond T truck is hauling the gravel.

tion, $418,000. The state gasoline tax will provide $4,330,000 and motor vehicle license fees and other income, $278,000.

Data on the division of construction funds and the yardage and cost of previously awarded excavation contracts to be carried over are not available.

Illinois

About $34,500,000 will be available in 1938 for Illinois highway construction according to preliminary estimates. This figure includes about $9,000,000 in incompleted contracts carried over from 1937, and represents an increase of 50 per cent over 1937 construction expenditures.

Total highway incomes expected in 1938 are: Regular Federal Aid, $5,250,000; Secondary Road fund, $1,050,000; Grade Crossing fund, $2,650,000; state gas tax, $36,000,000; and motor vehicle license fees, $20,000,000.

Work carried over from 1937 and additional work programmed for construction, but not yet under contract, consists of 216 miles of grading; 188 miles of gravel or crushed stone surfacing; 11 miles of bituminous surfacing; 100 miles of paving; and 115 bridges. The estimated cost of this work is $17,000,000. The balance of $17,500,000 has not yet been allocated for various types of construction.

In 1937 approximately $7,210,250 in gas tax funds was used for other than highway purposes.

Indiana

An increase of 62.6 per cent in highway funds available for 1938 is expected for Indiana, according to the State Highway Commission. A total of $18,200,000 is anticipated. Plans call for $9,900,000 to be used for construction; $4,500,000 for maintenance; and $3,800,000 for miscellaneous expenses.

Federal Aid funds are expected to furnish $3,200,000 of Indiana's 1938 total; state gas tax will bring in $10,000,000; and vehicle license fees and weight tax will total about $5,000,000.

The planned program calls for grading to cost $3,656,137; roadside improvement costing $237,943; high type paving costing $4,224,994; low type paving costing $524,303; and bridge construction costing $1,256,623.

Figures for yardages and miles of construction in the 1938 program are not yet available.

Iowa

EXCAVATING ENGINEER PROGRAM FOR 1938 NOT YET PREPARED SUMMARY OF 1937 WORK NOT YET COMPLETED.

As indicated by the above telegram, received from the State Highway Department, it is impossible at the present time to estimate the coming year's program, or to give definitely 1937 work. Preliminary estimates for 1937, however, indicated a total expenditure of about $37,400,000. In 1937, Iowa received a total of $5,360,373 of Federal funds. $3,291,322 of this was in Regular Federal Aid; $658,264 for Secondary roads; and $1,410,787 for grade crossing elimination.

● This Sac County, Iowa highway job is being done by Wernimont Brothers of Auburn. The No. 11 Adams elevating grader is equipped with low-pressure Goodrich tires.

FEDERAL-AID SECONDARY ROAD PROJECTS

AS OF OCTOBER 31, 1937

STATE	APPORTIONMENT	COMPLETED DURING CURRENT FISCAL YEAR			UNDER CONSTRUCTION			APPROVED FOR CONSTRUCTION			BALANCE OF FUNDS AVAILABLE FOR NEW PROJECTS
		Estimated Total Cost	Federal Aid	Miles	Estimated Total Cost	Federal Aid	Miles	Estimated Total Cost	Federal Aid	Miles	
Alabama	$ 532,939				$ 34,997	$ 25,200	2.4	$ 114,200	$ 57,100	1.2	$ 475,839
Arizona	365,990										340,790
Arkansas	437,550										437,550
California	971,644				2,094	1,215	1.3	105,323	61,138	15.9	909,291
Colorado	467,211				14,016	7,008					460,203
Connecticut	161,085										161,085
Delaware	125,000										125,000
Florida	340,953										340,953
Georgia	646,656				19,398	9,699					636,957
Idaho	314,137	$ 108,777	$ 54,386	22.5	69,903	35,396	3.8	67,364	33,681	7.4	190,674
Illinois	1,047,760				83,432	41,716	1.1	826,000	413,000	65.5	593,044
Indiana	629,802										629,802
Iowa	658,264										658,264
Kansas	674,825										674,825
Kentucky	469,863	7,532	3,766	2.8	704,252	241,580	130.1	141,556	63,248	44.8	161,269
Louisiana	365,898										365,898
Maine	224,534	32,550	16,275	2.4	297,336	147,458	18.5	88,000	44,000	5.5	16,801
Maryland	208,787				6,263	3,132					205,655
Massachusetts	353,987							5,300	2,650		351,337
Michigan	778,706										778,706
Minnesota	699,036				20,970	10,485		165,320	58,180	25.6	630,371
Mississippi	449,542										449,542
Missouri	775,578	308,790	151,225	140.5	594,120	259,590	71.5	376,570	139,445	62.5	225,318
Montana	524,346							13,983	7,865		516,481
Nebraska	528,285							152,454	75,423	17.7	452,862
Nevada	326,477	5,004	4,338	.9	55,890	48,467	8.2	75,878	65,722	10.0	207,950
New Hampshire	125,000							3,750	1,875		123,125
New Jersey	340,365										340,365
New Mexico	408,137							9,189	5,604		402,533
New York	1,251,771				1,034,860	517,430	73.7	864,400	432,200	46.0	302,141
North Carolina	599,674				184,390	92,195	42.4	113,580	56,790	18.7	450,689
North Dakota	399,283										399,283
Ohio	928,069				27,840	13,920		185,000	92,500	3.8	821,645
Oklahoma	599,124										599,124
Oregon	418,474	86,431	45,480	30.6	52,890	32,295	4.7	34,860	21,260	4.5	319,439
Pennsylvania	1,086,871				32,606	16,303		38,580	19,290	5.6	1,051,278
Rhode Island	125,000				139,698	69,849	3.9				55,151
South Carolina	344,438							59,830	29,820	6.6	314,618
South Dakota	416,820				6,690	3,700					413,120
Tennessee	536,222										536,222
Texas	1,591,522										1,591,522
Utah	289,556				82,600	59,180	12.0	35,400	24,400	4.1	205,976
Vermont	125,000				121,950	55,000	7.2	145,180	57,650	7.1	12,350
Virginia	465,674							71,094	29,432	9.7	436,242
Washington	400,575				39,223	20,609	8.5	256,959	129,200	19.4	250,766
West Virginia	278,089										278,089
Wisconsin	621,411				55,048	24,300	6.7	81,451	30,000	6.6	567,111
Wyoming	320,070	82,970	51,260	7.2	227,420	140,520	23.9				128,290
District of Columbia	125,000										125,000
Hawaii											
Puerto Rico	125,000				217,720	108,860	11.2				16,140
TOTALS	25,000,000	632,054	326,730	206.9	4,125,606	1,985,107	431.1	4,031,621	1,951,473	388.2	20,736,690

Kansas

The highway budget in Kansas will total approximately $14,242,000 in 1938. This sum equals expenditures made for highway purposes last year.

Construction will require $8,047,000; maintenance, $5,350,000; and administration and miscellaneous, $845,000.

Federal funds will be obtained from the following sources: Hayden-Cartwright Act, $190,000; Federal Aid, $2,400,000; Federal Aid secondary, $675,000; and Federal Aid grade crossing, $1,307,000. State funds will provide $8,995,000 and county funds for secondary construction, $675,000.

The following construction program is planned: 250 miles of grading, $3,922,000; 700 miles of gravel or crushed stone surfacing, $700,000; 500 miles of oil treatment, 500,000; 100 miles of stabilized base and Armor Coat, $450,000; 35 miles of high type paving, $1,000,000; 55 miles of bituminous mat, $275,000; and 105 bridges, $1,200,000.

Kentucky

Kentucky will have approximately $17,000,000 available for its highways in 1938, according to R. Y. Fishback, Engineer of Road Design. This is about the same total as in 1937.

Funds will be divided for use as follows: Construction, $9,000,000; Maintenance, $4,500,000; other $3,500,000. State gas tax is expected to provide $12,000,000 of these funds; Federal Aid will amount to $2,500,000; and vehicle taxes are expected to produce $2,500,000.

There were no highway funds diverted in Kentucky during 1937.

The 1938 program will include 130 miles grading at an estimated cost of $2,000,000; 100 miles of gravel or crushed stone surfacing at $1,000,000; 250 miles of oil treatment at $1,500,000; 65 miles of high type paving at $2,000,000; and 100 miles of low type paving at $2,000,000. Fifty bridges, to cost a total of $500,000, are planned.

The Public Works Administration has now allotted funds for 910 non-Federal highway projects. By granting $77,854,000, P.W.A. made possible construction estimated to cost $226,874,000. In addition, P.W.A. has made 9,877 Federal allotments for streets and highways estimated to cost $462,713,000.

In addition to the above, about 700,000 yards of highway excavation previously awarded will be carried over into 1938. Cost of this work totals $25,000.

Louisiana

An increase over 1937 highway funds is expected for 1938. Total is reported by the State Highway Commission as $20,265,000. Construction funds are estimated at $16,265,000; maintenance at $3,500,000; and equipment purchases at $500,000.

Anticipated funds will come from the following sources: Hayden-Cartwright bill, $1,830,000; other Federal funds, $1,165,000; state gas tax receipts, $9,100,000; vehicle license fees, $4,696,000; other State funds, $3,574,000.

Receipts from the Louisiana gas tax of 7 cents are divided as follows: To Highway Commission, 4 cents; to Port of New Orleans, Port of Lake Charles and Louisiana State University, 1 cent; collected by State but prorated to Parishes, 2 cents; Federal tax, 1 cent. In addition to the above, the city of New Orleans levies a 1 cent tax.

On the 1938 program are 18 miles of grading at $520,000; 440 miles of gravel and crushed stone surfacing at $3,100,000; 197 miles of high type paving at $10,511,000; 12 miles of asphalt surface treatment at $158,000; 13 bridges and grade separations at $1,897,000; and roadside improvements at $79,000.

About 2,000,000 yards of previously awarded excavation will be carried over into 1938.

Maine

Highway work in Maine will cost a total of about $11,206,000 during the coming year, according to the State Highway Department. This figure includes work under contract in December, 1937.

If Hayden-Cartwright funds are not reduced, Maine's share will be $2,500,000, and other Federal funds will add $335,000. Estimated receipts from state gas tax will be $5,800,000; from motor vehicle license fees, $4,400,000.

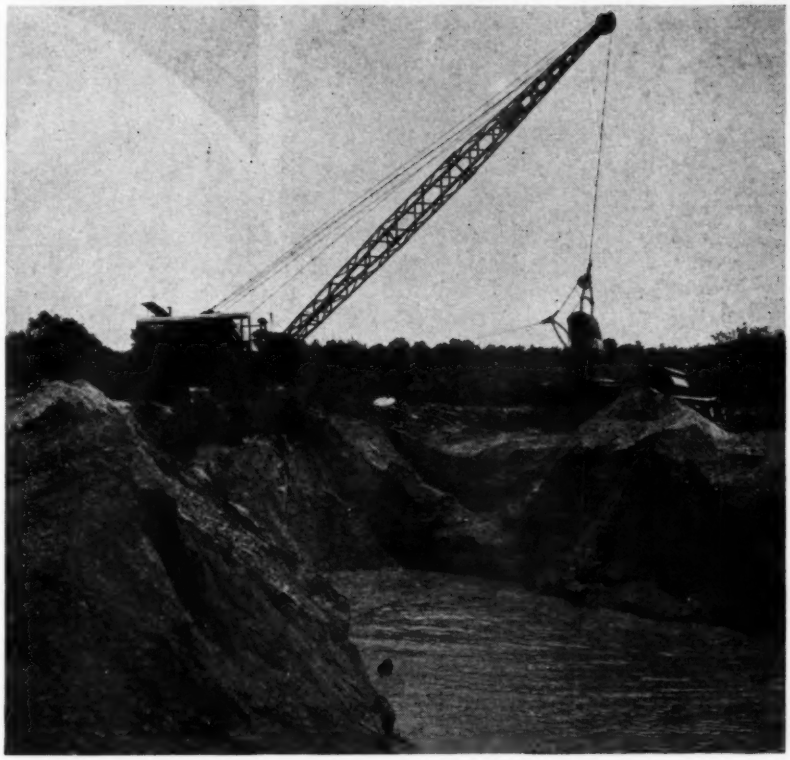
Construction program for 1938

● Roberts Paving Company of Salisbury, Maryland, has this road job outside of Harrisburg, Pennsylvania. The tough rock cut extends for 1¼ miles, paralleling the Susquehanna River. Blasted rock is loaded to Caterpillar-drawn Athey wagons by this Bucyrus-Erie 43-B.

FEDERAL-AID GRADE CROSSING PROJECTS

AS OF OCTOBER 31, 1937

STATE	COMPLETED DURING CURRENT FISCAL YEAR					UNDER CONSTRUCTION					APPROVED FOR CONSTRUCTION					BALANCE OF FUNDS AVAILABLE FOR NEW PROJECTS
			NUMBER					NUMBER					NUMBER			
	Estimated Total Cost	Works Program Funds	Grade Crossings Eliminated by Separation or Relocation	Grade Crossing Structures Reconstructed	Grade Crossings Protected by Signals or Otherwise	Estimated Total Cost	Works Program Funds	Grade Crossings Eliminated by Separation or Relocation	Grade Crossing Structures Reconstructed	Grade Crossings Protected by Signals or Otherwise	Estimated Total Cost	Works Program Funds	Grade Crossings Eliminated by Separation or Relocation	Grade Crossing Structures Reconstructed	Grade Crossings Protected by Signals or Otherwise	
Alabama						$ 72,327	$ 72,327	1			$ 82,600	$ 82,600	3			$ 860,243
Arizona						4,718	4,718									309,876
Arkansas						13,401	13,401									880,002
California						353,219	353,219	4			269,710	269,115	1			1,252,322
Colorado						9,860	9,860									647,497
Connecticut																426,784
Delaware											79,118	79,118				170,882
Florida																712,816
Georgia						18,346	18,346									1,204,753
Idaho						6,271	6,271				91,757	91,584	1			320,260
Illinois						39,675	39,675				409,000	409,000	1			2,196,305
Indiana						442,090	442,090	2	4		152,600	152,600	2			713,423
Iowa						593,934	563,400	7	3		252,513	237,000	3			610,387
Kansas						37,460	37,460	1			489,655	489,655	8		1	780,554
Kentucky											145,000	145,000	1			774,174
Louisiana																799,226
Maine						5,287	5,287									347,181
Maryland						7,800	7,800									512,193
Massachusetts						15,710	15,710									1,031,790
Michigan						56,972	56,972	1			924,640	924,640	8		17	683,195
Minnesota						303,668	303,668	2		4	410,561	410,561	1	2	6	628,580
Mississippi											182,800	182,800	2			623,907
Missouri						22,930	22,930				170,735	156,660	3			1,349,330
Montana						164,882	160,000	2			10,068	10,068				501,136
Nebraska						13,394	13,394				33,738	33,738	1			845,844
Nevada						35,109	35,109		1							214,891
New Hampshire											3,750	3,750				246,250
New Jersey											89,876	75,000	1			922,689
New Mexico											6,484	6,484				425,807
New York						130,400	130,400		1		598,900	598,900	3			2,695,099
North Carolina											121,780	121,780		1		1,122,882
North Dakota						12,046	12,046									791,022
Ohio						32,120	32,120									2,109,584
Oklahoma																1,156,175
Oregon						464,086	464,086	4	1		32,021	31,372		1		92,915
Pennsylvania						43,585	43,585				142,000	125,000	1			2,737,086
Rhode Island																250,000
South Carolina																752,928
South Dakota																694,096
Tennessee																958,753
Texas											18,000	18,000	1			2,706,825
Utah											196,309	196,309	4			126,576
Vermont	$ 6,390	$ 6,390			2	120,140	120,140	1	1		2,530	2,530			1	120,940
Virginia						30,110	30,110	2			182,960	182,960	1	3		728,586
Washington						146,762	146,762	2	1		10,855	10,855			5	610,374
West Virginia						10,075	10,075				58,430	58,430	2			603,207
Wisconsin						564,426	564,426	4			18,500	18,500				669,945
Wyoming											161,470	161,470	1	2		183,491
District of Columbia											119,828	119,828		1		130,172
Hawaii																250,000
Puerto Rico																369,959
TOTALS	6,390	6,390			2	3,770,803	3,735,387	33	12	4	5,468,188	5,405,307	49	10	30	40,852,916



● Working in a sand pit near White Marsh, Maryland, to supply gravel for a new Philadelphia road. Contractor is Harry T. Campell & Sons of Towson, Maryland. Machine is Bucyrus-Erie 33-B dragline.

calls for $7,000,000, and maintenance will require $4,206,000. About 300,000 yards of previously awarded highway excavation will be carried over into 1938.

Maine had no diversion in 1937.

Maryland

The State Roads Commission reports an increase of approximately 22 per cent in funds expected to be available for highways in 1938. The total of $15,705,994.93 will be divided for use as follows:

$9,035,000 for construction (including unencumbered balance of previous year's appropriations); $3,048,672.89 for maintenance of State and County Roads; $3,662,322.04 for other purposes.

Federal funds anticipated total $3,455,000, of which $1,771,000 will be under the Hayden-Cartwright bill. Net to the State Roads Commission from State gas tax will be $7,680,044.55; from vehicle license fees, etc., $4,570,950.38.

● Loading ¾-inch trap rock for use on secondary road construction in northern New Jersey, Consolidated Sand & Stone Company of Montclair Heights uses this Haiss Model 135 loader. Rated capacity of this loader is from 5 to 8 yards per minute.

The anticipated program calls for the following division of construction funds: grading, 3,500,000 yards at $1,200,000; gravel and crushed stone surfacing, 14 miles at $282,500; oil treatment, 700 miles at $375,000; high type paving, 42 miles at $1,695,000; low type paving, 85 miles at $847,500; 25 bridges at $3,600,000. Approximately $1,000,000 will be required for Rights-of-way.

1,379,400 yards of highway excavation, costing $431,800, will be carried over into 1938.

Massachusetts

Chief Engineer G. H. Delano reports that the State legislature meets in January, and until appropriations are made it is impossible to know definitely what amounts of money will be available for 1938.

At present Massachusetts has available for 1938 expenditure of 1938 Federal allocations. These amount to $1,769,936 Regular Aid, to be matched by State funds; $353,987 for secondary highways, also to be matched; and $1,047,500 for grade crossing elimination. Approximately equal sums from the 1939 Federal allocations will be available for 1938 expenditure provided the authorized allocations are not cut.

In 1937 the transfer from the Highway Fund to the General Fund was $6,000,000.

Michigan

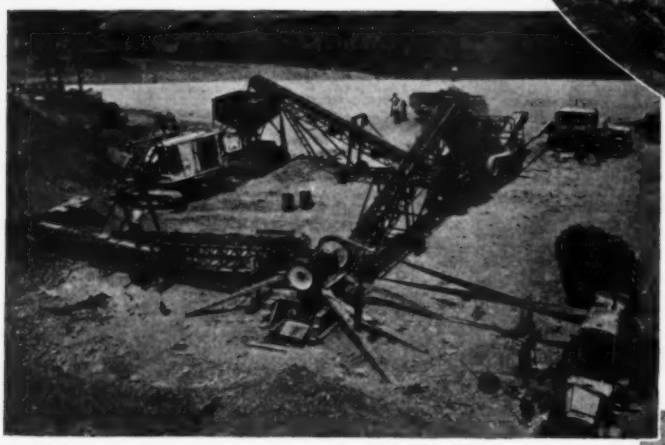
According to information received from H. C. Coons, Deputy

(Continued on page 62)

County highway work in Illinois; a Caterpillar RD4 and 33 Grader cut the high bank. Modern equipment has greatly facilitated construction and maintenance of county roads.

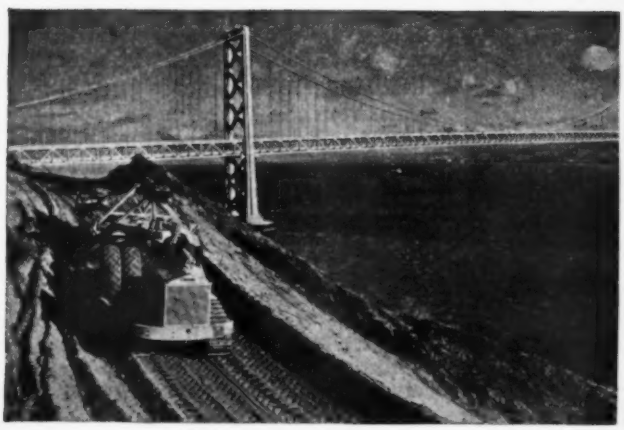
Speed and mobility are requisites for modern highway jobs. This ⅜-yard dragline is digging foundations for bridge near Sunman, Indiana, will handle 160,000 on the 7½ mile road job.

MODERN



Getting out the raw material. Buck Helean's Pioneer crushing and screening plant, with primary breaker unit, produces gravel for a road job near Missoula, Montana.

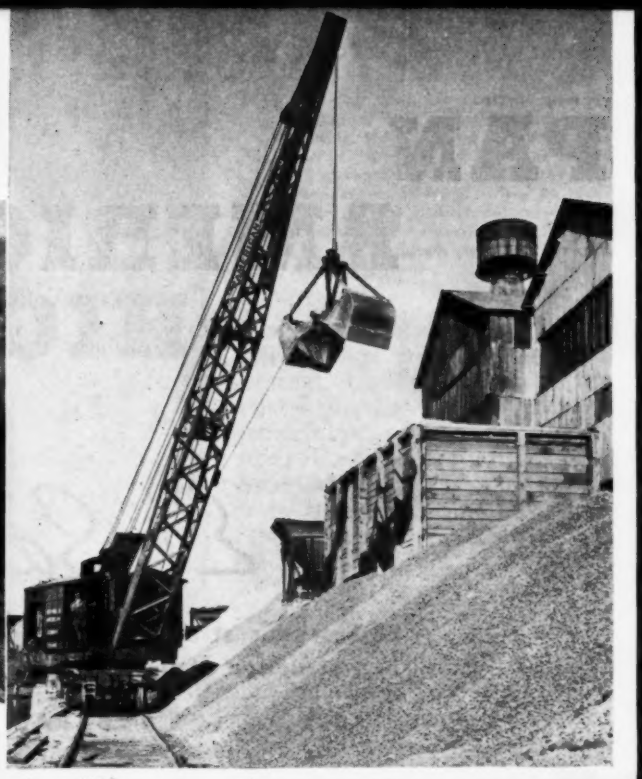
This Allis-Chalmers "L-O" tractor and Isaacson bull-dozer are putting a stretch of the South Santiam Highway through the Cascade Mountains, 50 miles southeast of Albany, Oregon.



San Francisco-Oakland Bay Bridge furnishes background for FD Cletrac pulling 18-yard LeTourneau Scraper. The unit is building a road around Yerba Buena Island to serve 1939 Exposition traffic.

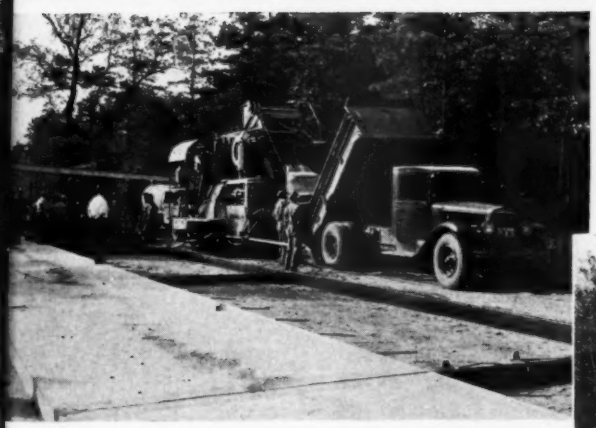
HIGHWAY BUILDING

Motor graders are finding ever-increasing use in both construction and maintenance work. This W. A. Riddel unit, tired by Goodyear, is owned and operated by the Maryland State Roads Commission.



For rehandling sand and gravel, Wm. P. McDonald, of Long Island, New York, uses this American Hoist Crane, equipped with latest model 1½-yard Hayward bucket.

"Seagoing" shovel. Nello Teer's Bucyrus-Erie 48-B fords a river as part of the day's work in eliminating bad curves on route 16 near Monterey, Pennsylvania.



Vincent Schiavi, general contractor of Wilmington, Delaware, lays a new concrete highway with his Ransome dual drum paver.

Wm. P. McDonald handles this Riverhead, Long Island, highway job with International TracTracTors, Bucyrus-Erie 4-wheel scrapers, bulldozers and ⅝-yard dragline.

PAN AMERICAN HIGHWAY PROGRESS

El Salvador

El Salvador stresses modern equipment to speed up construction of its portion of new international route.

By RALPH HANCOCK

AMERICAN Tourists, dragging their homes behind them, or taking pot luck in local hotels will soon be able to travel a highway so strange and new it has no equal anywhere.

Whether winding past smoking volcanoes in altitudes demanding sweaters and topcoats, or plowing through gaudy tunnels in the green, hot, jungle, the Pan American Highway through Central America will average more thrills per mile than any road heretofore open to the American motorist. And as usual very few of them will realize the tremendous power combination of man and machinery it has taken to build it.

Only a few years ago even some of those who held records of achievement in American road building were unable to visualize such an undertaking and labeled the Pan American Highway the pipe dream of internationalists and fanatics. But now, although native drivers cover this area daily in everything from ox-carts to smart Ford and Chevrolet camionettes, and although one cannot as yet recommend some of the stretches for the American tourist spoiled by pavement and good bridges, it is only a matter of months before it will be possible to drive in comfort from the United States through Mexico, Guatemala, and El Salvador to the border of Honduras.

For those privileged ones who have had a hand in similar construction and enjoyed the satisfaction of participating in other notable highway projects, and for a more intelligent appreciation of the unusual scenery, the strange peoples, and stranger climates, let us study some of the thought and skill that have gone into the building of this "ribbon of international friendship."

Route Follows Old Trails

Much of the Pan American Highway through the Central Americas follows the Maya and Aztec roads established centuries before. Many traces of these ancient highways have recently been unearthed in the Guatemalan jungles and occasionally the modern highway cuts through a supposedly virgin forest and discovers a cobblestone trail built 3,000 years ago. Power

● Winding through scenes of picturesque beauty, the Pan American Highway will be a boon to tourists. The very physical setting which gives many sections their beauty, however, means tough problems for the road-builder. The section illustrated here is between San Salvador and San Miguel.

● Cut and fill work in narrow, jungle-filled valleys between corduroy ridges is all in the day's work. Here, a Salvador-owned Bucyrus-Erie 1¼-yard shovel is loading a 13-yard Athey bottom-dump wagon. Just behind this, a Caterpillar tractor, bulldozer-equipped, levels off a short fill section.

shovels bite into a jungle-covered hill and find it is the temple of a once mighty race, or the explosion of dynamite is followed by a crashing sound half a mile away as a huge stone monolith, balanced for centuries, tumbles to the floor of the jungle.

But dense jungle growth, miles of solid volcanic rock, and innumerable rivers have not been the greatest difficulties overcome in this construction. Engineers have had more to say about the extreme climatic and weather conditions affecting the work, the difficulties through ill health, and the tedious slowness of native labor. Washouts taking away miles of fresh grading or preliminary bridge construction in a single night of five to seven inches of rainfall. Slides that for a pure and simple tangle of vines and trees and rocks were unequalled. Days when active and healthy bosses were as scarce as the rare quetzal bird. These were only a few of the difficulties.

The most rapid advance and the greatest improvement in the Pan American Highway to date has been the development through the republics of Guatemala and El Salvador, and the stretch between Laredo, Texas, and Mexico City.

Internal Highway Importance Aids International Road

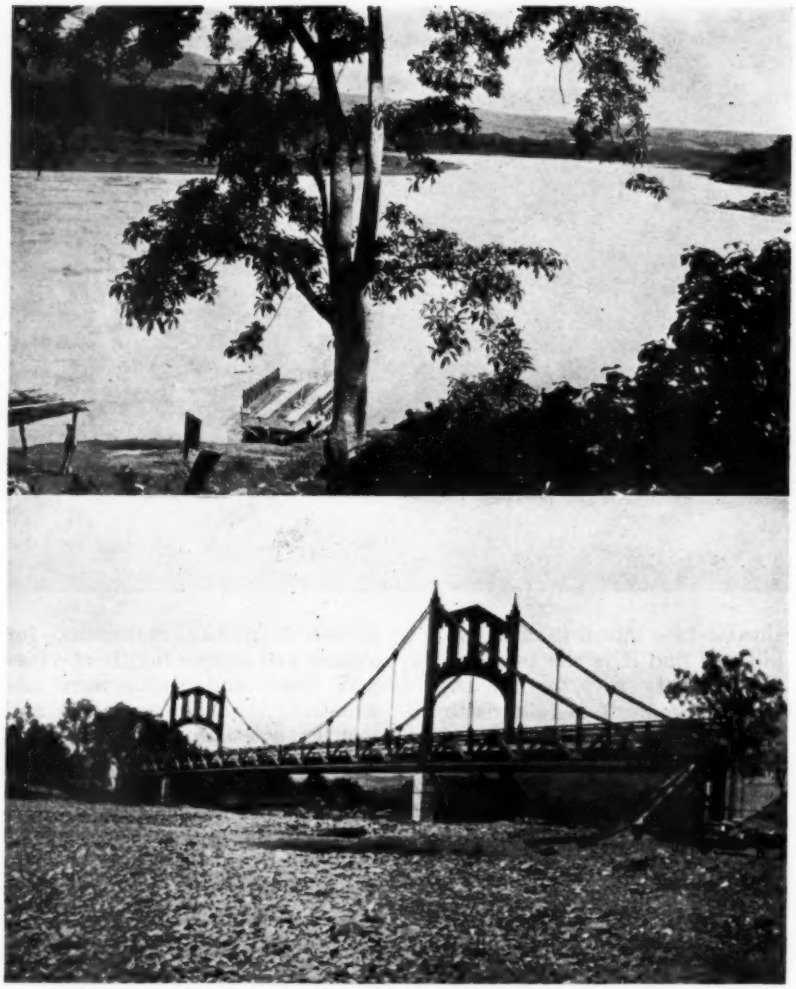
El Salvador, although the smallest of the Central American Republics, is the most densely populated. With an average of 120 inhabitants per square mile, (recent government estimate) and approximately 85% landowning, this little country gives the visitor an impression of industry and activity seldom equalled in other Latin American nations. Practically self-supporting in the matter of foodstuffs and clothing and therefore in vital need of intrastate roads, the Salvadoreans have made their internal highway system the most important of their national construction projects. Therefore, when the pioneers of the Pan American Highway plan came down through here to sell their idea they found travel well established from border to border of El Salvador, and a partly paved highway linking busy Santa Ana on the western frontier with the capitol San Salvador in the center and the mining and maguey town of San Miguel near the eastern border.

● Work on the El Salvador section of this highway is being done under supervision of Engineer Manuel Lopez H., Sub-Secretary of Public Works. J. Antonio Guerra and Julio C. Alcaine are superintendents in charge of excavation by power equipment.

In Guatemala the commission found the same condition, since under the leadership of a progressive president interested only in his country's welfare, the only job remaining was to widen, straighten, and surface, and build a few bridges.

To President Martinez of El Salvador, and General Jose Tomas Calderon, minister of Interior, among the first to take an active interest in the betterment of El Salvador's highway system, goes much of the credit for recent accomplishments. With two mountain chains crossing the entire country, sending out numerous spurs enclosing narrow jungle filled valleys, El Salvador presented some intricate problems. Five volcanoes, San Miguel, San Vicente, Santa Ana, San Salvador and the famous lighthouse of the Pacific, Izalco, all exceeding 7,000 feet in height, presented obstacles around which the international stretch of highway must pass. Many of the ancient trails were discarded in favor of new surveys and straightening. Climatic conditions vary according to the altitude: along the coast and in the low-lying sections it is extremely hot. In the uplands where the capitol and most of the larger towns are situated, the temperature varies from 60 degrees Fahr. to 97 degrees in the

● **Top: The Rio Lampa, largest Central American river emptying into the Pacific, is still crossed on ancient ferries. However, bids will be taken soon for a modern highway bridge near this ferry. Dense, alligator-infested jungles border this section of the highway. Bottom: The new international bridge between Guatemala and El Salvador, recently opened, is the largest bridge project yet completed for the central American section of the Pan American highway. It was partly donated by the United States government.**



shade. March to May, immediately preceding the rainy season, are the hottest months. The rainy season beginning in May usually continues into November, some of the areas receiving over 100 inches during the season. Occasionally during the latter stages of this season a spell of continuously rainy weather occurs, called a **temporal**. This may last any time from three or four days to as many weeks. Typical of the disasterous effect of such weather was the deluge (followed by a cyclone) in June, 1934, which caused damage to the amount of $1,000,000 to railways, buildings, and roads, besides causing great loss of life and damage to crops. Much of El Salvador's prized new highway construction and the tedious work of many months went into the discard with this flood.

Perseverance Counts

But the native Latin American, although often pictured as temperamental and firey, is a patient cuss, with a stoicism imbred through centuries of fighting for an existence in the tropics, and within a few weeks after the flood the highway had been put back and construction proceeded as before. How many times this has happened the records do not say, since it is all a part of the day's work for these people, and not to be taken as exceptional circumstances.

Although the jungles would seem to present some problems in the impenetrable tangle of forest growth, a few good machette swingers can soon make noticeable headway, and the greatest difficulty in such areas is in building up the bed to sufficient height and solidness to hold continual traffic through wet weather. Fortunately, however, for El Salvador, these low stretches are short and nearly always immediately between or near mountainous sections, so that rock and dirt has been conveniently shifted from mountain cut to jungle bottom without much difficulty. One Bucyrus-Erie 1¼-yard Diesel shovel and two E-12 Athey Forged-Trak Bottom Dump Trailers of 13-yard capacity (Athey Truss Wheel Co. of Chicago), and a large number of native oxcarts performed most of this work. A couple of Roadbuilders, one 54 cu. ft. Crescent Scraper Bucket, two drag levelers, and one model 77 Cat. Grader No. 9C-59 were used for the fills and close shifting. Other equipment, mostly purchased within the last two years, include one Diesel 75 HP Caterpillar tractor, three Diesel 50 HP Caterpillar tractors, and one revolving ripper. Recently two more 50 HP Caterpillar tractors and another roadbuilder were added to the above equipment. Besides the above, the Highway Department of El Salvador operates a fleet of 32 Mack trucks, plus some of other makes, several rock crushers and miscellaneous equipment used in macadam building. Which on the whole may not seem like much equipment for the job in hand, but considering the size of this republic, it represents a large investment.

With native labor extremely cheap in El Salvador, experience there has been that it is as cheap to handle most projects by hand as with the machinery they now have available.

However, it has proved that machinery speeds up the work

● Top: In cuts like this one between San Miguel and San Salvador, the going is made tough by frequent slides caused by extremely soft, sandy soil and excessive rainfall. Notwithstanding such handicaps, work is being constantly pushed ahead. Bottom: In the wet sections of El Salvador's part of the highway, drainage presents a real problem. Illustrated here is one type of culvert being used to meet the problem. Note size of man standing in the tunnel.

and it is being used on the Pan American Highway construction because the country is anxious to complete this section of the international road as soon as possible. The asphalt surfaced macadam is advancing on the average of almost three kilometers monthly on the Pan American Highway in the rainy season.

Contract System Not Used

None of the machinery work, or any other part of the highway construction in El Salvador, is being done by contract at present. All of it being performed under the direct supervision of the Sub-Secretary of Public Works, Engineer Manuel Lopez H., and his staff of engineers. Most of the machinery equipment, purchased late in 1935, is now in use on a new cut-off between San Salvador and San Miguel. The Superintendents directly in charge of excavation work with machinery are engineers J. Antonio Guerra and Julio C. Alcaine. Engineer Lopez H., mentioned above, was formerly with R. W. Hebard & Co. of New York. Much of the credit for the early surveys and first construction work performed in El Salvador must be given this company also. It was following the recent change in politics that all construction was taken over by the National Government.

3,014,757.32 colones have been spent on the construction of the Pan American Highway and its maintenance from January 1, 1933, to December 31, 1936. This amount includes culverts, several bridges, and some extra large drainage projects. During that same period 1,017,011.57 cubic meters of dirt were moved, of which about 35% was sand and rock.

Excessive rust by the constant humidity is one of the greatest wearing factors of machinery in the tropics, but since all equipment in use on the Pan American Highway is active nearly every day of the year and wipers and oilers can be had for $2.50 to $3.00 (American) per week, equipment is easily maintained.

Perhaps the most important cut in the Salvadorean section of the Pan American Highway is between Santa Ana and the city of San Salvador. Here for a distance of four miles, across countless hills and jungle valleys only a few yards wide, the road cuts a straight furrow averaging fifty feet deep. It was in the western end of this cut that the greatest difficulty was experienced with slides. One of the foremen working this section tells the story of a slide that was so perfect, the trees and underbrush retaining their natural position so well that every evidence of construction work was completely obliterated and the Indian natives near there thought a miracle had been performed. In fact many of them believed it so thoroughly that they were loath to return to disturbing soil that to them was clearly meant to be left alone.

From the cool altitudes near the volcanoes to the hot green hell of the jungles, the Pan American Highway in Central America will give the motorist his money's worth in thrill and adventure. It is unquestionably one of the greatest international projects ever attempted.

First Imbiber: "I found (hic) a half dollar."

Second Inebriate: "It's mine, it'sh got my name on it."

"What'sh your name?"

"E Pluribus Unum."

"Yeah, it'sh yoursh."

Spending Other People's MONEY

AN EDITORIAL* By B. C. HEACOCK,
President Caterpillar Tractor Company

I FEAR that the complexities of our present-day social structure have caused us to lose sight of the basic fact that society is simply a great labor exchange.

In the earliest days, I suppose, each individual was dependent wholly upon himself to supply all his needs and wants. Then with the family and later the tribe and eventually nations, there developed exchange of services and goods—one man gathered fowl and fruit for his neighbors while those neighbors built for him a shelter. One fashioned garments to exchange for the services of another who gathered firewood. Each found greater advantage to himself in this arrangement.

But then, as now, it was essential that each of the parties to the exchange get fair value. When the garment maker demanded of the fuel supplier too great a pile of wood in exchange for his garments, the wood carrier went without the new clothes and gathered his own wood. And today, because the bricklayer and carpenter ask more for their services than many people are willing or able to pay, home-building has slumped and construction labor remains idle. Unless goods are produced at a reasonable cost and sold at a reasonable profit, the manufacturer of those goods can't find enough people who want those goods to permit him to maintain employment opportunities.

When I speak of producing goods at a reasonable cost, I mean also that there must be provided a profit that will allow a reasonable return to the stockholders. That long suffering and much abused group, toward whom some have chosen to incite class hatred by terming them "economic royalists," are in general people who have been willing to forego immediate enjoyment of all of the fruits of their labor and have thereby accumulated funds which they have supplied to provide the land and buildings and tools for industrial enterprises. If we condemn them, we condemn thrift and remove one of the most potent incentives for human progress.

I fear that much I have said may seem elementary. It is elementary, but I am emboldened to say it because there seems to be so much popular misunderstanding on the subject. Particularly is this true in relation to taxes. Let me quote from a speech made on October 19, 1932 by Franklin D. Roosevelt, then a candidate for the office of President of the United States. Candidate Roosevelt said:

"Taxes are paid in the sweat of every man who labors because they are a burden on production and can be paid only by production. If excessive, they are reflected in idle factories, tax-sold farms, and hence in hordes of the hungry tramping the streets and seeking jobs in vain. Our workers may never see a tax bill, but they pay in deductions from wages, in increased cost of what they buy, or (as now) in broad cessation of employment. There is not an unemployed man—there is not a struggling farmer—whose interest in this subject is not direct and vital."

If the truth so ably expresed in the above words has been forgotten by their author, so too have many others—many millions of others—forgotten or overlooked the fact that "taxes are paid in the sweat of every man who labors."

I think perhaps even many business men have forgotten or overlooked the fact as to who pays the taxes, though I prefer to believe that when they fall into the habit of complaining about high taxes and protesting against the recklessness of government expenditures, they do so as public servants, conscious of the fact that business does not and cannot pay taxes, but can be only a tax collector.

TAXES are not paid by business. They are paid "in the sweat of every man who labors." To an extent that would astonish most citizens, taxes are collected through the routine functioning of business—through the price of everything enjoyed by our common, everyday people—and turned over to the governmental treasuries by business concerns. Clearly the "Sweating Laborer" puts up the money that is so freely disbursed by the Government Agencies and so long as he wants his money so spent, public officials are happy to accommodate

*From an address delivered to Trade Paper Editors

him. It is, then, a matter for all of the people who make up this nation of ours to rebuke or encourage reckless spending by public officials, to indicate whether they approve or disapprove, and to make their choice of whether certain functions shall be performed by government or by privately owned industry.

Obviously, if it were not necessary to add all costs, including taxes, to the price of food, clothing and other goods which an individual must buy, the price could be lower and the individual could buy more and better things for himself. The question for all individuals—collectively, as they make up Society—to decide is whether they receive more satisfaction from giving money to government, through prices, for the purposes for which government spends it; or whether they would get greater satisfaction by having their money go further, because of lower prices, for the things each individual desires for himself and his family.

We in business generally believe that we make a contribution worth more to Society than are many of the contributions made by government. At the same time we realize the fact that some governmental services are desirable and through long practice and from modest beginnings are efficiently performed. But we are not the jury as to these values! The customers of business are the jury and their verdict is expressed in patronage.

If those who pay the bills believe that they get greatest value through public expenditure of their funds, they vote for those who promise to spend it. If they believe that the goods and services supplied by business will bring them most happiness, they patronize business and vote for those who promise to reduce public services, reduce taxes and so leave them the value of the product of their labor to exchange for the product of other labor.

THIS, I believe, is what actually happens. Some are conscious of it; most of us play our part without exactly realizing what it is. For this reason, some are misled into the thought that there is no plan and that our country should, therefore, have a great brain somewhere putting a plan on paper. Our economic plan is in our hearts, in our manner of life—it is a living plan—an ever active plan which is continually fitting itself to our desires. It has given us a scale of living so high and a per capita ownership of automobiles and bath tubs and radios and telephones and numerous other conveniences and luxuries so great that we are the envy of those corners of the world which have operated upon a blueprint prepared by someone—a planner—a reformer—a dictator. Every day, everyone of us actually helps shape the destiny of our nation, by patronizing those who best serve our desires instead of being forced to accept those services which some great master mind dictates. This is democracy. A national plan, even if it were possible, is Dictatorship.

In this competition between public officials and private enterprise, for the privilege of spending the "Other People's" money, both contestants should be truthful, honorable and wholly fair. Private enterprise should not misrepresent its goods and public officials should not misrepresent their services. I think both should cheerfully bow to the will of the public as voiced through patronage. Each should contest mightily in the effort to be the better servant.

My own belief, based upon present and past examples, is that everything which can be done at all by private enterprise can be better done in that manner than through Public Officers. It is not difficult to see why this is true. From the very nature of people, our Public Officers achieve their temporary jobs by pleasant promises, some of which are kept. One-half of the promises are meaningless to begin with because at least one-half of the candidates are not elected. A lot of the promises of the successful candidate cannot be fulfilled because they never had the foundation of practicability. Many others of the promises are forgotten by the voters immediately and consequently are abandoned by their maker.

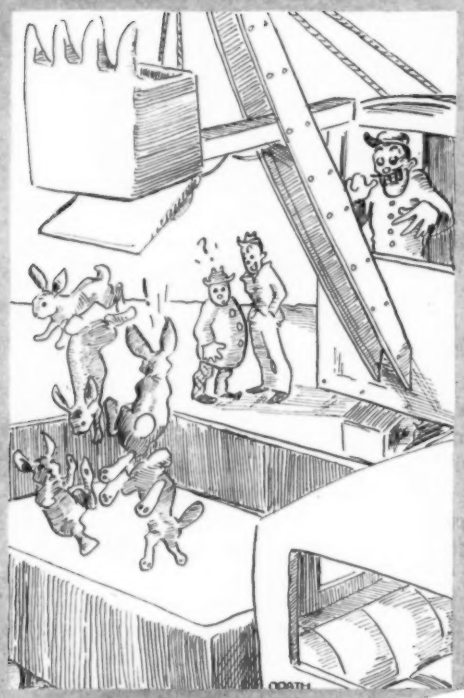
ON THE other hand, business leadership makes no promises, bases its claim of being the better social agency upon performance and must develop and survive in its longer tenure of office in the face of intense, if intermittent, competition from some of these governmental agencies and from equally intense and steadier competition from its business rivals.

Industry—all business enterprise—is a public servant. It exists by the public will. Good business men are conscious of their place in Society and their responsibility to Society. Good business leadership can force an improvement in the quality of public service and can discourage any tendency or desire to turn more functions over to government by itself constantly providing the public with better value. The two great urges to better service and greater value spring from intense competition and adequate reward for meritorious achievement. We shall share the low scale of living of the rest of the world in degree as we diminish the influence of competition and reward. Unnecessary restraint of competition and undue restrictions on reward have already made millions of unemployed and more millions under nourished, poorly dressed and inadequately sheltered, in a land of abundant power and raw materials.

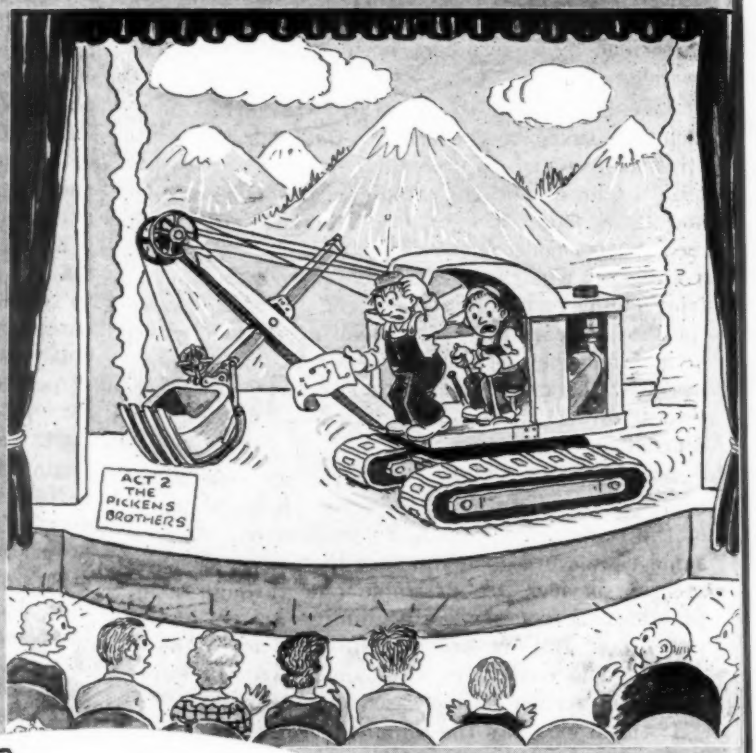
We can retrace steps taken in a direction in which we have been lured by a mirage—we can again proceed on the straight path that has been our highway since freedom was first sought on our shores.

God grant that we will!

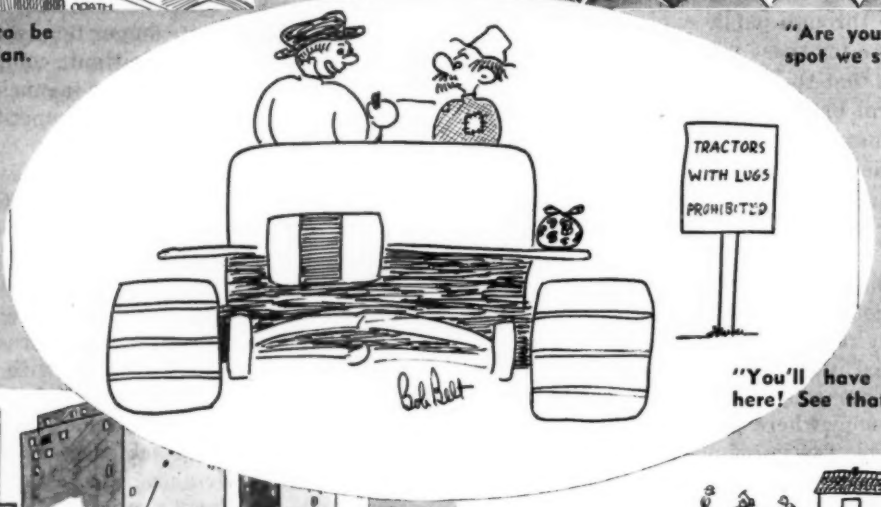
EX-KAFF 2



He used to be a magician.

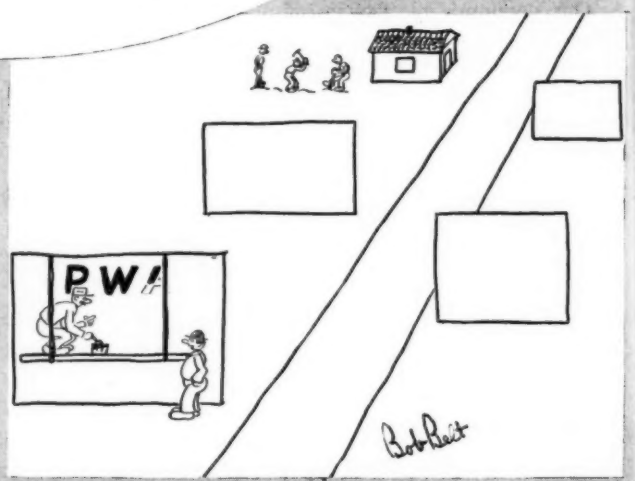


"Are you sure this is the spot we start excavating"?



"You'll have to get off here! See that sign"?

"Follow that car, Buddy."



"Yea, I took a sub-contract to paint those signs."

LOUISIANA Overpass

● Two similar approaches for a Louisiana overpass constitute this Wm. F. Rodgers job. Total dirt moved was about 120,000 yards. Two scraper units, like the one shown, working three 8-hour shifts daily, handled a large part of the yardage. Combined average output per shift was 412 yards.

WM. F. RODGERS, general contractor of Little Rock, Arkansas, recently completed two fills forming part of an interesting overpass job at Benton, Louisiana. The contract called for construction of two similar approaches, each about 640 feet long and ranging, on a 5 per cent grade, up to a maximum height of approximately 32 feet. The roadway laid on the fills was 24-foot slab, flanked by shoulders about 10 feet wide. Side slopes on the fill were banked on a 3 to 1 slope. Total dirt moved was about 120,000 yards. Equipment used for excavation and building up the fills included two International TD-40 TracTracTors pulling 2-wheel, 3½-yard Bucyrus-Erie hydraulic scrapers; a Koehring 301, ¾-yard shovel; and five Ford trucks with 2-yard dump bodies.

Operations were on a three-shift basis, with three months allowed under the contract for completion of the dirt work. A satisfactory borrow pit, providing an average haul of 600 feet was available. Runways at 25 per cent grade and ranging in length from 30 to 90 feet were constructed into the borrow pit which had a maximum depth below ground level of 10 feet. Material handled was red clay mixed with a little sand. It provided no particular difficulties in loading, dumping and spreading.

Scrapers loaded in from 60 to 70 feet. The 25 per cent grade haul ran up to between 120 and 140 feet, with the remaining length of haul varying according to the part of the fill being built up at any one time. Loads were "spilled" out the back of the scrapers, which dump in much the same way as a truck. One edge of the tilted bowl provided a bulldozing blade which the operator used to level the fill to rough grade as he backed up before starting the return trip.

An average of 2½ yards of pay dirt per load was moved by the scrapers. With actual running time per shift about 7 hours, the scrapers together handled an average of 165 loads per shift, average output per scraper per shift being just over 206 yards. On the shovel excavation, the Koehring 301 and Ford trucks moved an average of 600 yards per shift.

Scraper units were greased, inspected and refueled at the end of every shift to insure continuous, smooth operation. Superintendent for Wm. F. Rodgers on this job was W. O. Obentine.

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Safety Trends

By S. J. WILLIAMS

Director Public Safety Division,
National Safety Council

There is no panacea for accidents. The substantial, steady progress which is reducing accidents in certain states and cities results from a more or less standard course of action which has been recommended for years. As the public becomes increasingly conscious of the terrific human and economic losses sustained annually on our streets and highways, action—and probably drastic action is likely to be demanded.

The point which should be stressed, and stressed now, is that significant accident reduction cannot be conjured out of the air, it must rest on a continuous application of principles which are already known.

Some new trends of thinking and action in the safety program have become increasingly emphasized in recent years, and are likely to play important parts in 1938 and the future. Briefly, some of these are:

1. Recognition that **both** long range construction of super-highways and most efficient utilization of existing street and highway facilities are essential. These two are not competitive; both are necessary.

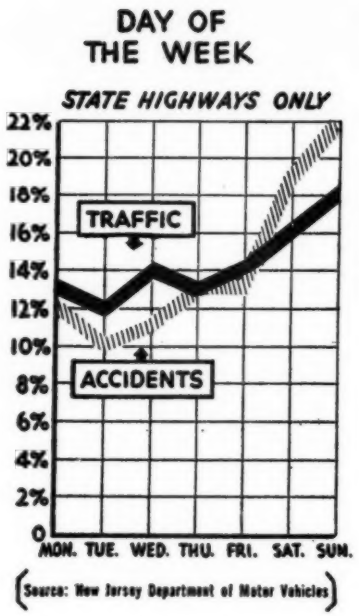
2. More emphasis on training of personnel—engineers, police, teachers, etc. As public anti-accident sentiment grows, it must be harnessed and turned into practical channels. For this, two things are necessary; a well-trained group of specialists and . . .

3. An adequate foundation of accident statistics and factual data. To obtain this, there has been a rapid increase and improvement in accident reporting.

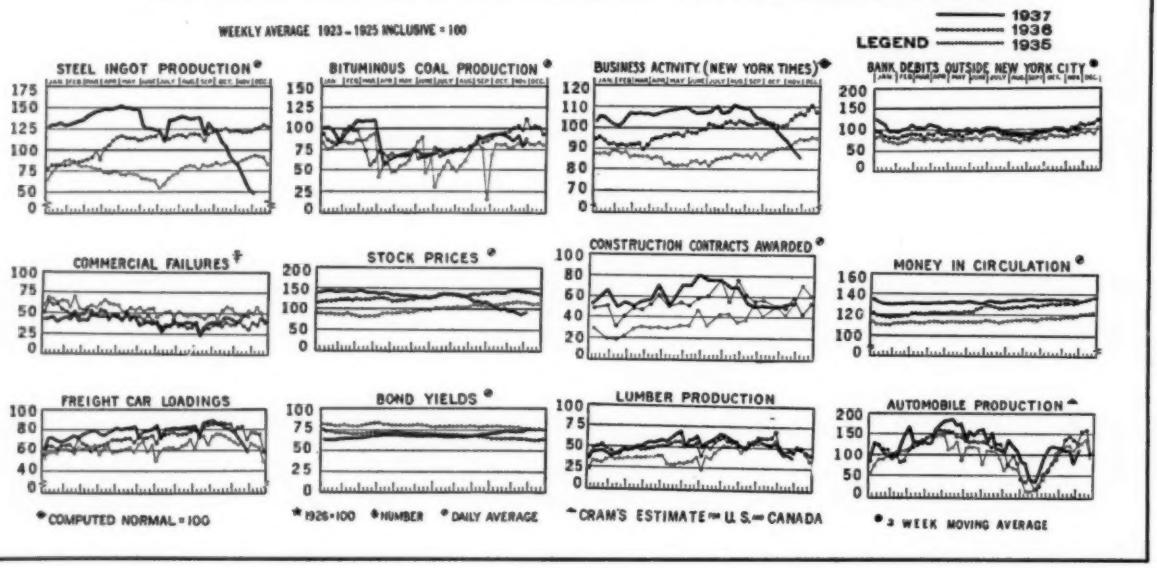
4. Recognition of the tremendous importance of effective official functioning—including engineering departments, police and courts. Safety records of such cities as Milwaukee and Evanston are good evidence of this.

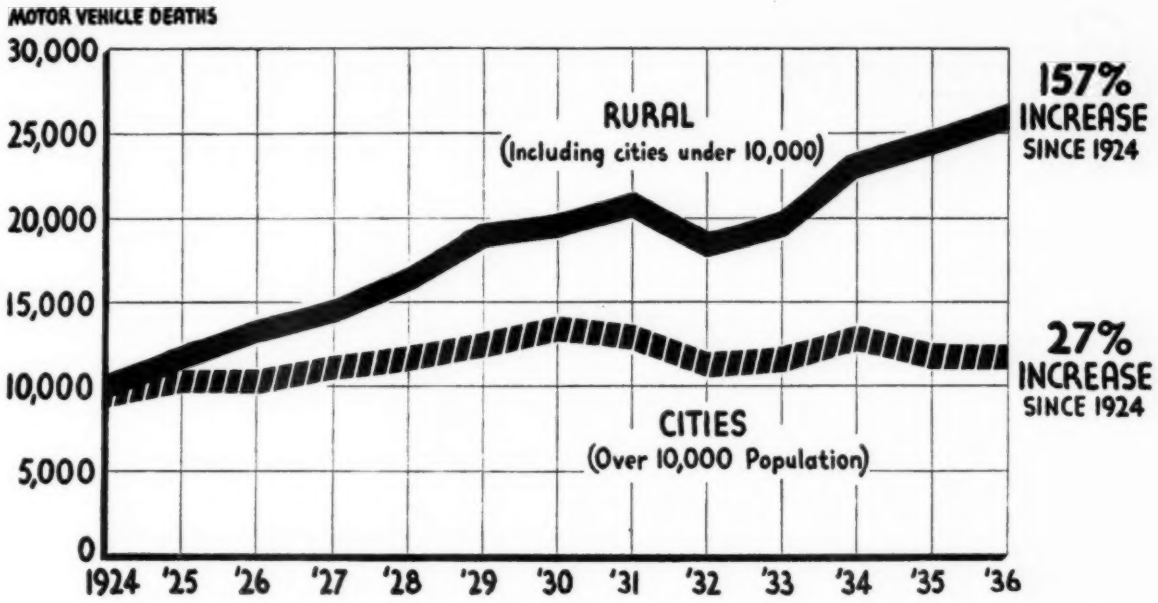
5. Specialization of safety education. Not only must public emotional interest be aroused, but people must be given specific information and instruction on how to drive safely. Particularly is this true of high school teaching on safe driving.

In general, I should say that



WEEKLY BUSINESS INDICATORS


WEEKLY AVERAGE 1923-1925 INCLUSIVE = 100
LEGEND 1937 1936 1935
STEEL INGOT PRODUCTION *
BITUMINOUS COAL PRODUCTION *
BUSINESS ACTIVITY (NEW YORK TIMES) *
BANK DEBITS OUTSIDE NEW YORK CITY *
COMMERCIAL FAILURES †
STOCK PRICES *
CONSTRUCTION CONTRACTS AWARDED *
MONEY IN CIRCULATION *
FREIGHT CAR LOADINGS
BOND YIELDS *
LUMBER PRODUCTION
AUTOMOBILE PRODUCTION ^
*COMPUTED NORMAL = 100
*1926=100 †NUMBER *DAILY AVERAGE
^CRAM'S ESTIMATE — U. S. — CANADA
*3 WEEK MOVING AVERAGE



probably the greatest need today is for competent leadership. With so many factors essential to a sound safety program, with a constant, year-after-year grind on all details of that program necessary, we must have able leaders to correlate the program, to stimulate and handle wisely the growing public interest.

Safety is a job, and a tough one. If it is to be done well, it must be done by experts. Our annual accident bill is so tragically high that every sound effort we can make to reduce it will pay dollars and cents profit. Every attempt to reduce the funds available for the job, by diversion or otherwise, every citizen who preserves a shoulder-shrugging "what the hell" attitude must bear the responsbility for an accident toll which shows an alarming ability to increase despite every effort to check it.

The Coming Highway Year

A 1938 highway year even bigger than 1937 is indicated by the individual state forecasts—if the President's recommended slash in Federal funds is not made.

With over 28,000,000 motor vehicles using the highway, gas tax receipts will continue upward. Continued anti-diversion agitation may result in significant checking of that invidious practice. The ever-growing public safety sentiment and the continued emphasis on the need for safer roads and streets should have beneficial effects on state legislatures—again if a sad example is not set them by the national government.

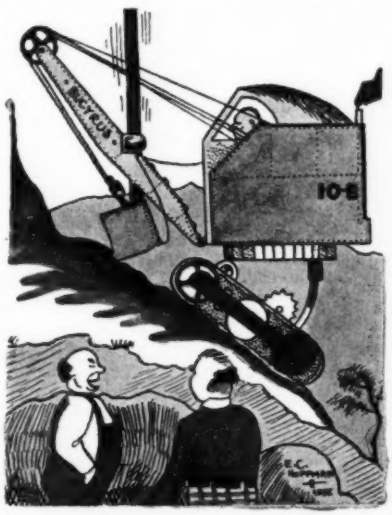
About half the states report 1938 highway funds approximately equalling 1937 expenditures. A majority of the remaining states expect increases ranging from 2½ to 62 per cent. Decreases, where reported, seem to be due in large part to the winding up of emergency Federal programs.

Crying need shown by the present situation is recognition of the necessity for putting highway financing on a sound long-time basis. There is no excuse for regarding our highway as a sufficient or static system which can never reach absolute adequacy. There is even less excuse for allowing our highway financing to become a grand scale political football.

It is perfectly possible, it is urgently desirable, it will be ultimately essential to put this country's highways on a true economic basis.

Good highways pay their own way; they should be given every opportunity to do so.

Excavating Engineer wishes to take this opportunity to thank the various state highway departments, once more, for the courteous cooperation and special effort which make it possible to present these annual state highway forecasts.



"It's just something he rigged up for this mountain job."

Our Cover

Major January sporting event is the annual Rose Bowl football game at Pasadena. Traffic arteries are naturally taxed getting the crowd to and from the Bowl. On our cover is a Spence Airphoto showing traffic on Colorado Blvd. on the way to last year's game.

Contractor Brown: "What did your son learn at college?"

Contractor Green: "Wal, he hadn't been home a week before he showed me how to open bottles with a half dollar."

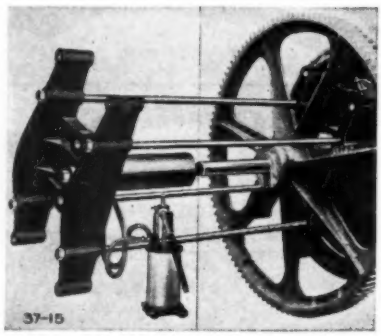
Equipment you ought to KNOW ABOUT

Portable Hydraulic Press

A new portable hydraulic press which can be used either as a puller, press, or jack is announced by the Bucyrus-Erie Company, South Milwaukee, Wisconsin. The BECO Press is made expressly for use on heavy machinery to press large gears on shafts, pull bevel pinions, pull drum shaft gears, for press work on shovel gears, spiders, sprockets, swing shaft assembly, crowd shaft assembly, shipper shaft, and track mechanism. In addition it is ideal for use as a jack of capacity to 150 tons. As a jack the compact press cylinder (ram) weighing only 75 pounds is used to lift and can be set up in any position.

The BECO Portable Press includes a frame for press work weighing 310 pounds, a 4-speed pump weighing 75 pounds, a press cylinder or ram weighing 75 pounds and having a pressure capacity up to 150 tons, 4 alloy steel frame rods, a back plate, and high-pressure hose and valve connections.

Special equipment available includes sprocket lugs, frame extension rods, connectors for extension rods, extra long high-pressure hose, angle iron stand for frame, and frame for track repair work.



The Bucyrus-Erie Company will be glad to send bulletin S-115 describing the Beco Portable Hydraulic Press to those interested.

Utility Compressor

A self-contained utility compressor unit for mounting on a motor truck is announced by Ingersoll-Rand Company.

The unit operates independently of the truck motor and transmission. It is usually placed crosswise of the truck body so that it takes up but the minimum amount of loading space. Its dimensions are 6'7"x2'3½", yet it will operate two I-R paving breakers, or one I-R 45-pound Jackhammer and one I-R paving breaker.

The compactness of the unit allows the truck to be used for the transportation of tools, men, and the other equipment required for maintenance work.

The unit weighs but 2,100 pounds and is equipped with a lifting bale so that it can be lifted off the truck and put in operation on the ground should this be necessary.

Torches

McCloskey Torch Company, Toledo, Ohio offers two new products in the way of a bomb shell torch and a torch-flare. The bomb shell torch is made of 13 guage steel, has a 4 quart capacity,

weighs 9½ lbs., has an 8½" diameter, and is 8½" high. The torch-flare is made of 18 gauge steel, has a 2 quart capacity, a red flag 12" x 12" with 18" x $\frac{3}{16}$" steel staff. These torch-flares come in a kit containing 3 torches, 2 flags and spring clips for fuses and flags.

Diesel Battery

A complete line of specially constructed batteries for Diesel starting service is announced by The B. F. Goodrich Company, Akron, Ohio. In the line are four 6-volt types, two 8-volt types and ten 12-volt types.

Eight of the batteries are of conventional construction and eight built with the Kathanode construction. Port Orford Cedar separators, are used in the separators of the conventional type.

The new line of Diesel batteries, according to the manufacturer,

● **Heavy duty White truck, model 920, 6-wheel, with ⅜-yard Browning gasoline shovel mounted directly on the frame. Unit has walking-beam type axle. Owned by W.P.A., it is shown on road work in Cuyahoga County, Ohio.**

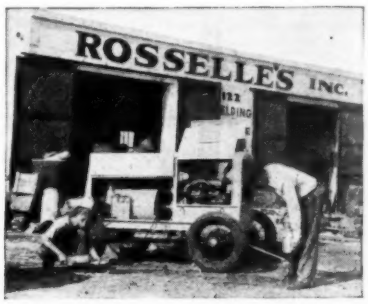
are built with thinner plates than heavy duty types, giving instant reaction and quick motor turnover. Adequate power is available instantaneously to ignite the fuel oil and start the motor in coldest weather it is claimed.

Pressed Steel Frame Pumps

A new line of pressed steel frame mounted ball-bearing centrifugal pumps is announced by Worthington Pump and Machinery Corporation, Harrison, New Jersey. Available for belt or motor drive, these type CF pumps are suitable for handling capacities from 10 g.p.m. to 300 g.p.m., at heads from 10 ft. to 120 ft.

Engine-Driven Welder

Rosselle's, Inc., Miami, Florida, reports a shop-built 200-ampere engine-driven welder. The basis of this portable machine is a new 200-ampere 1750 r.p.m. P&H-Hansen Smootharc Welding Genera-

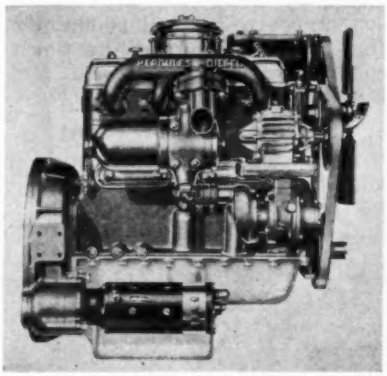


tor. This generator was mounted upon a home-built frame with pneumatic-tired wire wheels, and connected up with a discarded Ford Model A motor. The entire mounting, including the motor, cost less than $40.00. The high circuit voltage of the generator is said to be ideal for operating grinding or drilling tools.

Four-Cylinder Diesel Engine

Hercules Motor Corporation announces the series "DOO" four-cylinder Diesels for use in commercial vehicles of smaller sizes as well as for a variety of industrial, agricultural, oil field and marine applications. Three models of the new series have been produced. The smallest, the "DOOB" has a bore of 3¾" and a stroke of 4½" with the total piston displacement of 198.8 cu. in. The "DOOC" has a bore of 4" and a 4½" stroke with 226.2 cu. in. displacement and the "DOOD" has a 4¼" bore and 4½" stroke with a 255 cu. in. displacement.

The "DOOB" is rated at 62 H.P. and the "DOOC" at 70 H.P. at an



engine speed of 2600 R.P.M. At 1600 R.P.M. the "DOOD" develops 56.5 H.P.

New Haiss Units

"Motomove," a portable conveyor and "Hustler" a bucket loader are two new products announced by the George Haiss Manufacturing Co., Inc., New York, N. Y. "Motomove" is a conveyor of the flat belt type especially adapted for handling coal and features skirt boards for heaping the load, dust screen discharge chute electric or gasoline motor mounted overhead, and open loading.

The "Hustler" made primarily for stockpile loading needs features Truss-type boom, slow speed crowd, creeper mounting, propeller feeding device, and a claimed capacity of 3 yards per minute.

Highway Widening Machine

The new Buckeye Model 16-R-4 highway widening machine has recently been developed to meet the need for equipment which can be used for excavating along side of the present pavement where roads are to be widened. This machine will dig a trench from 12 to 48 inches wide at one cut, working right up to the curb or edge of existing pavement, leaving an evenly graded subgrade, ready for the foundation of the new pavement.

New Gasoline Engines

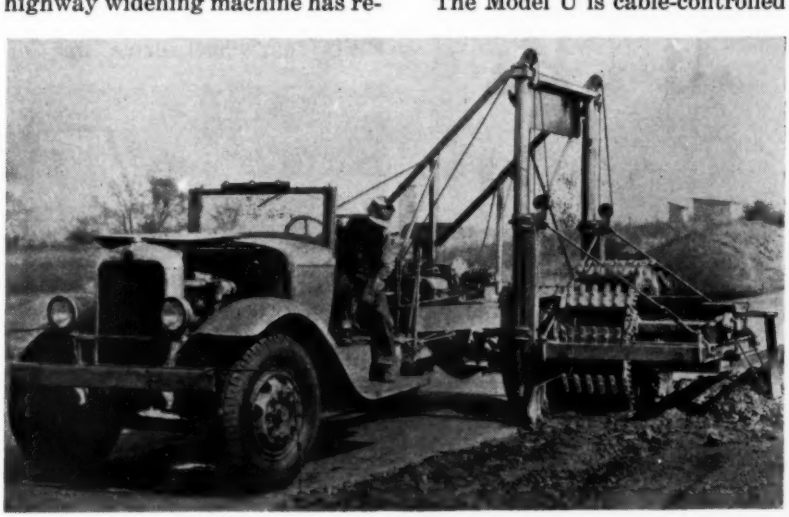
Two new models of gasoline engines have been announced by The Buda Company of Harvey, Illinois. These models are known as the M-707 and M-766. They are six-cylinder engines with overhead valves. The M-707 has 707 cubic inch displacement with a 5" bore and 6" stroke. The M-766 is 5½" by 6" and has 766 cubic inch displacement. Lubrication is by position force feed pressure to all crankshaft, camshaft, connecting rod and piston pin bearings and to rocker arm shafts and timing gears.

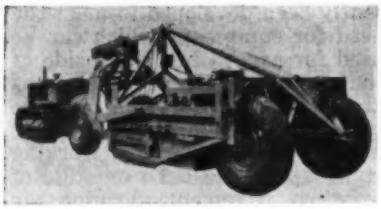
The M-707 and M-766 are built for various types of installations including shovels, cranes, draglines, hoists, heavy duty trucks, stationary and portable compressors, pavers, crushers, locomotives and rail cars.

Carryall Scraper

A new Carryall Scraper—the Model U—has been added to the line of Carryalls manufactured by R. G. LeTourneau, Inc. It has an expanding bowl which consists of two buckets—the rear bucket telescopes into the forward bucket when empty; when loading, the rear bucket fills and is carried back by a return spring.

The Model U is cable-controlled





by means of a LeTourneau 2-Drum Power Unit, mounted on the tractor which draws the Carryall. To facilitate loading, both the front apron and tailgate can be manipulated through the Power Unit. The high apron lift gives ample clearance for loading and unloading rocks and bulky material.

Air Line Anti-Freeze

A system of air line and air tool freeze preventative known as "Frosto" is being marketed by the Sullivan Machinery Company to supplement "Tanner Gas" on construction, industrial and mining operations. "Frosto" has been developed particularly for industrial applications and wherever electric current is available for its operation. In operation, "Frosto" is vaporized and fed into the compressed air line near the compressor as fast as necessary to prevent freezing of water vapor in the compressed air lines and air tools.

Current consumption is small and thermostatically controlled, and only about a quart of "Frosto" is required to treat 100,000 cubic feet of free air under the worst conditions of temperature and humidity.

Portable Power Plant

Road contractors, construction superintendents and others will be interested in the small power and lighting plant manufactured

by the Kato Engineering Company, Mankato, Minnesota.

The plant pictured is the Model JRA3. It weighs 55 pounds, is fully portable, and furnishes 350 watts, standard 110-volt, 60-cycle alternating current for operating standard appliances such as electric drills, saws, grinding wheels, flood lights, etc.

The plant consists of a self-excited generator connected directly to a small gasoline engine and also provides about ten amperes direct current at six volts for other purposes.

F W D Truck

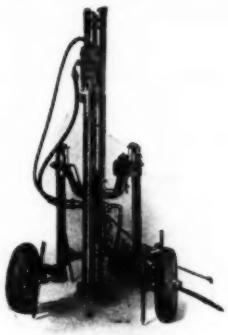
The Model HG, newest of the FWD four-wheel drive line of trucks, and designed especially for highway maintenance work, has just been announced by the Four Wheel Drive Auto Co., of Clintonville, Wis., and Kitchener, Ont., Canada.

Among the features of the new maintainer unit is the construction of the patented FWD transfer case for this particular model. The case has been built so that a clearance of 23 inches under the driving mechanism permits the installation of an underbody scraper, or other underbody maintenance equipment.

Speed in high gear, with engine governed at 2,500 rpm, and standard tires as equipment, can reach 37.4 miles per hour, according to FWD engineers. Five speeds forward, and one reverse, and a transmission of selective sliding gear type are other features.

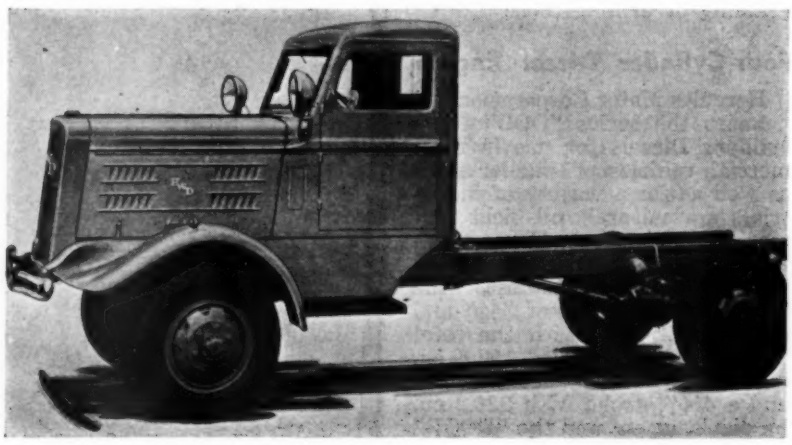
New Wagon Drill

Ingersoll - Rand, Phillipsburg, New Jersey, have recently bought out a new type wagon drill known



as the FM-2. These drills feature automatic feeding in all directions, 3-wheel flexible mounting, convenient levers for easy operator control, an air-motor con-

(Continued on page 44)



WAY TO LOWER COSTS

If you're interested in tractor power that gets up on its tracks and moves dirt quickly and at low costs, investigate the FASTER POWER of Allis-Chalmers Oil Tractors. It's Faster Power because A-C design eliminates speed-robbing deadweight—tractor weight saved means extra payload gained ... Faster Power because A-C tractors have more and higher speeds; that means greater flexibility and the right speed for every task. Faster Power because A-C tractors start instantly and go right to work—no fussing with or waiting on auxiliary motors ... finally, Faster Power because A-C tractors are geared to give maximum performance in the higher speeds at which you do 90% of your work. Watch that Faster Power gain extra trips hourly over ordinary, slower-moving tractors.

LOWER IN COST, TOO Not only is A-C tractor power faster, it's Lower-Cost Power, too. The first cost is lower. The operating cost is lower because Allis-Chalmers Controlled Ignition Oil Engines operate on Diesel fuel oils and require no special lubricants. Maintenance cost is lower because Controlled Ignition eliminates the destructive vibration, the high pressures and high temperatures that cut down the normal tractor's life. Compare the performance and cost of FASTER POWER with slower-moving conventional tractors. Ask your nearest A-C dealer for the facts.

6 FORWARD SPEEDS UP TO 6.41 M. P. H. WITH THE MODEL "L-O"

INSTANT STARTING
LOWER MAINTENANCE
QUICKER PICK-UP
BETTER BALANCE

LET'S GO! ROAD SHOW, JANUARY 17-21, CLEVELAND, OHIO

HALMERS
ON—MILWAUKEE, U. S. A.

Controlled Ignition
OIL TRACTORS

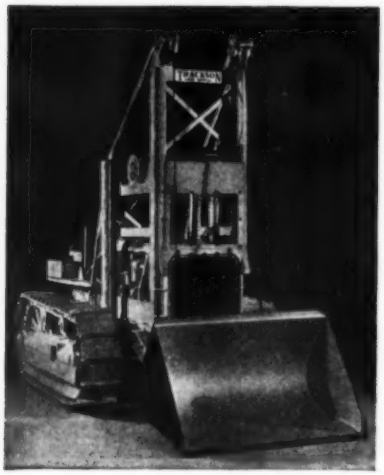
Equipment You Ought to Know About

(Continued from page 40)

trolled pressure feed, swivel axles enabling the wheels to be turned a right angle for line hole drilling close to a wall, and a one piece tubular frame.

Heavy Duty Digger-Loader

The Trackson Company, Milwaukee announces the Trackson high shovel now available on "Caterpillar" Tractors R4 and D4. This heavy-duty digger and loader it is said will excavate in clay, gumbo or rocky soil; do stripping, leveling and subgrading; charge



conveyors, crushers and concrete mixers; remove snow; and transport or load all kinds of bulk materials. The Trackson High Shovel is regularly equipped with a ¾ yard bucket. Advantages claimed for this machine are: a fast mechanical hoist; independent front end drive; free dumping of the bucket at any point of the lift; automatic release when bucket reaches maximum height; full visibility for the driver.

Electric Generating Plant

A new gasoline engine generating set developed by D. W. Onan & Sons, Minneapolis, Minnesota for 1938 production has recently been announced. It is a 5000 watt, 110-volt, alternating current, electric generating plant suited for supplying electric current to places remote from electricity or for emergency standby wherever this amount of power or light is required.

The outstanding mechanical feature of the unit is its 90° V-type, four cylinder engine. The engine operates at 1800 RPM and develops over 15 H.P.

Portable Welder

A new, single-operator, portable welder, combining the WD-32B General Electric arc-welding generator and a standard 60-horsepower Ford V-8 engine, has been developed by the General Electric Company so that arc welding can be done independently of electric-power-line service. Designated as Type WD-32BY, the new welder has a NEMA rating of 200 amperes, 40 volt arc, 1 hour, 50 C, 60 to 200 amperes welding range. The complete unit, 24 inches wide, 60 inches long, and 43 inches high, can be loaded crosswise into practically any truck body. Net weight is approximately 1250 pounds. Features of the welder include self-excitation, duplex control, and self-stabilization.

Steel Decking

An open type of steel decking is now made by the Blaw-Knox Company of Pittsburgh. Its construction, it is claimed, prevents snow accumulation or ice formation and provides sure tread under all conditions. In addition to its safety, the steel decking is desirable because of its lightness. Bridges refloored with it are said to have been able to carry heavier loads without increasing the weight of the bridge structures.

The decking is especially desirable for bascule bridges because it reduces the weight to be lifted and decreases the wind resistance when the bridge is opened for water traffic.

"Jahn" Utility Trailer

The C. R. Jahn Company of Chicago, manufacturers of standard machinery trailers, now announce a new light-weight utility trailer for the transportation of the lighter types of machinery, such as tractors, compressors, pumps, and small shovels and cranes.

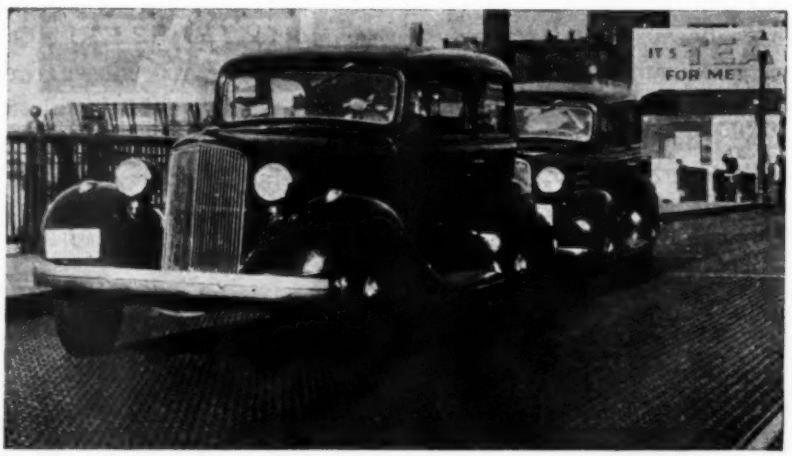
Dual-type wheels of heavily reinforced cast steel roll on oversized tapered roller bearings, and are all equipped with heavy duty full balloon pneumatic tires.

Arc Welding Electrode

A new mild steel arc welding electrode, designed particularly for use with small alternating current transformer type arc welders is announced by The Lincoln Electric Company, Cleveland, Ohio.

The new electrode, designated "Transweld" has a heavy extruded coating and, stable arc, easy to strike and hold, it is claimed.

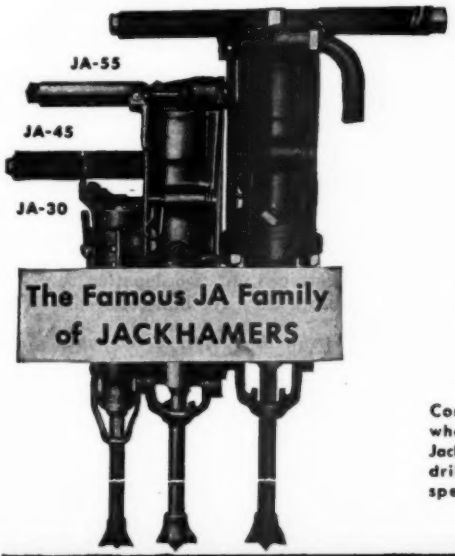
"Transweld" is suitable for making all types of welds in flat, horizontal, vertical or overhead position. The electrode operates equally well with direct current of either straight or reversed polarity. It is made in three sizes: 3/32, ⅛ and 5/32-inch. The smaller size comes in 12-inch lengths, the other two in 14-inch.



Two-Stage Air-Cooled PORTABLE COMPRESSORS

PIONEER BUILDERS OF THE TWO-STAGE AIR-COOLED PORTABLE

This Model 85A two-wheel trailer-mounted Portable Compressor is one of the new machines. It operates one JA-55 Jackhamer or two of the largest paving breakers.



The Famous JA Family of JACKHAMERS

Contractors everywhere are adopting Jackbits. They reduce drilling costs and speed up the work.

To the modern line of Two-Stage Air-Cooled Portable Compressors we have added several new models. These will be on display for the first time at our booth, Number E-36 at the Cleveland Road Show on January 17th to 21st inclusive.

We invite every roadbuilder and contractor to call at our booth and look them over. Other products which we will have on display are rock drills, Jackbits, paving breakers, hoists and pneumatic tools, each of which are made in a complete range of sizes and types.

If you cannot attend the show, ask our nearest I-R branch or dealer for complete information and catalogs 3264 and 1604-F.

SYI-2

Atlanta, Birmingham, Boston, Buffalo, Butte, Chicago, Cleveland, Dallas, Denver, Detroit, Duluth, El Paso, Hartford, Houston, Kansas City, Knoxville, Los Angeles, Newark, New York, Philadelphia, Picher, Pittsburgh, Pottsville, Salt Lake City, San Francisco, Scranton, Seattle, St. Louis, Tulsa, Washington

Ingersoll-Rand

11 BROADWAY, NEW YORK CITY

For your convenience in writing to Ingersoll-Rand, you will find a card bound in this issue.

The Grading Gang *Goes to Town*

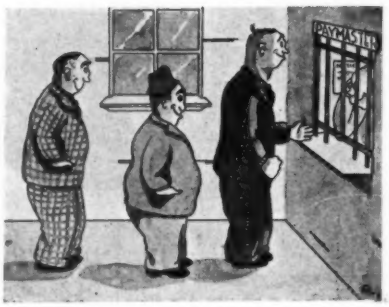
By BOB BELT

Illustrated by FINKLE

One pay day night the grading gang
  Went into Canyon town,
Intent to pick some dresses up
  And put some liquor down,
For moving dirt in sticky heat,
  Without a cooling breeze,
It aggravates a rarin' thirst
  And gives a man idees.
Duke Harding's gang of mucker men—
  Red Currigan, Bill Bunce,
Big Irish Walsh, the shovel man,
  Who went to college once,

The burly Polack shoulder man,
  Whose name was just a sneeze,
And Peewee Jones, who came about
  To Irish Walsh's knees—
Well, as I say, Duke Harding's gang
  They hit the village first.
They picked 'em up and set 'em down
  And quenched a lot of thirst.
They roared into the dining room
  Of Canyon Town's hotel
And told the few assembled guests
  To kindly go to Hell.

They commandeered the waitresses
  And headed for a dance.
They gave the gals a drink around,
  Peggy, Pearl and Nance.



Now on this same hot pay-day night,
  From off the blasting job,
A half a dozen hardrock men
  Came down to join the mob.
And as they wandered up the street,
  Hell-bent for any row,
They bumped into the grading gang—
  "Move over there!" "Yeah, now?"
"Say, if you think you guys are tough,
  Too good to let us by,
Here's half a dozen hardrock men
  Will know the reason why."

Big Irish gripped his crescent wrench.
  Up spoke the fearless Red:
"I never seen a hardrock man
  With nothing in his head."
The Waitresses dropped back a step.
  The hardrock men yelled "Hey!
Just wait a minute, girlies,
  Till we put your friends away."
Red Currigan rolled up his sleeves;
  The Hardrock men moved in;
The first to fall was Peewee
  From a wallop to the chin.

Red Currigan walked into one;
  A hardrock man went down.
The morning sun saw lots of blood
  On the streets of Canyon town.

Big Irish swung his mighty fists
  (He'd thrown away the wrench),
And knocked a pair of hardrock men
  Across a pool hall bench.
The two best hardrock fighters, though,
  Had gotten in their blows—
The Polack had a belly full,
  Bill Bunce, a broken nose.
Then toe to toe they slugged it out,
  Big Irish and the Duke,
And two hard-fighting hardrock men
  Named Mulligan and Luke.

"Crawl back into your coyote holes,
  You goddam powder monkeys!"
"I never seen a mucker yet
  Could lick his weight in flunkies."
And by the time the sheriff's men
  Came tearing down the street,
Big Irish was the only one
  Still standing on his feet.
His eyes were shut, his mouth was cut,
  He swung his fists and hollered.
He flattened out two deputies
  Before they got him collared.

Meanwhile the object of the fight,
  Those waitresses so swell,
Went off to play with drummers from
  The Canyon town hotel.

This WORLD'S LARGEST TANDEM

Hauls 50 to 54 Tons *Each Trip* WITH ONE TRUCK

● The largest tandem trail cars ever built have just gone into service for United Electric Coal Companies. In terms of cost per ton mile these haulage units are probably the lowest cost automotive coal units ever built.

Each trail car holds 33 cubic yards level full, and is built from the ground up to take the terrific impact of big shovel loading—the hammering jolts of travel over rough mine roads. The specially designed heavy duty solid steel axles, cast steel wheels, over-capacity springs, two way oscillating fifth wheel, enable the driver to put this triple tonnage hauling unit over the road safely without spillage or sidesway—give it the endurance and reliability of the "Western" railroad dump car.

Air operated clamshell doors controlled from the cab, enable the driver to dump each load separately at the desired location. With full door clearance the tandem can also be used for handling gob on the return trip, dumping on the ground wherever the material is needed for highway maintenance.

There are more Austin-Western trail cars used in open pit coal mines today than any other make of semi-trailer. Their performance records during years of service have already proved the value of "Western" dump car experience in designing pneumatic tired trail cars that are low in operating and upkeep costs.

Whatever your special requirements, Austin-Western engineers have the experience and the ability to give you the kind of haulage unit you require. Write us for complete performance and engineering details.

This single 25 ton trail car, similar in design to the new tandems, is one of a fleet of A-W haulage units owned by the Central State Collieries. Repeat orders from this company prove their economy and satisfaction.

The dolly shown here supports the front end of the rear tandem unit. Thus the tandem can be operated as single trail car units where desired.

Austin-Western

THE AUSTIN-WESTERN ROAD MACHINERY CO.
1821 Barrows St., Aurora, Illinois

Please send me your Trail Car Bulletins.

Name.....

Address.....

City.....

State.....TC796

When writing to The Austin-Western Road Machinery Co., please use coupon or card bound in this issue.

Shots from the FIRING LINE

Interior Construction Company Bids $34,442,240 for Grand Coulee

By Grace Kirkpatrick

A greater-than-capacity crowd, thronging to the Spokane Civic Building on December 10, gave dramatic testimony to the importance of the occasion—the reading of bids for the completion of Grand Coulee Dam, largest construction project ever undertaken by the Bureau of Reclamation.

Commissioner John C. Page pointed out the completed Grand Coulee dam would contain more concrete than all the other Bureau-built dams combined, plus all the concrete in Boulder Dam.

Reading of the bids, of which only two were submitted, produced a gasp of surprise from the audience. Low bid of $34,442,240 was submitted by a new firm, the Interior Construction Company. Present Crand Coulee contractors, Mason-Walsh, Atkinson-Kier had combined with most of the Six Companies group, builders of Boulder Dam, to form the new organization. It is reported that the joining of these powerful forces in the construction world had not taken place until the last minute, final details of the merger not being completed with a few hours before opening of the bids.

The second bid of $42,185,802.50, was submitted by another new combination firm, Pacific Constructions, Inc.

F. A. Banks, engineer in charge of construction at Grand Coulee, announced that the bids would be mailed immediately to Denver, and then to Washington as quickly as possible. Award of the contract is expected almost any time as this goes to press.

• Reading the bids for completion of Grand Coulee Dam. Shown in this picture, left to right, are: R. F. Walter, Bureau of Reclamation chief engineer at Denver; Commissioner John C. Page; Governor Clarence D. Martin of Washington; and F. A. Banks, Grand Coulee construction engineer.

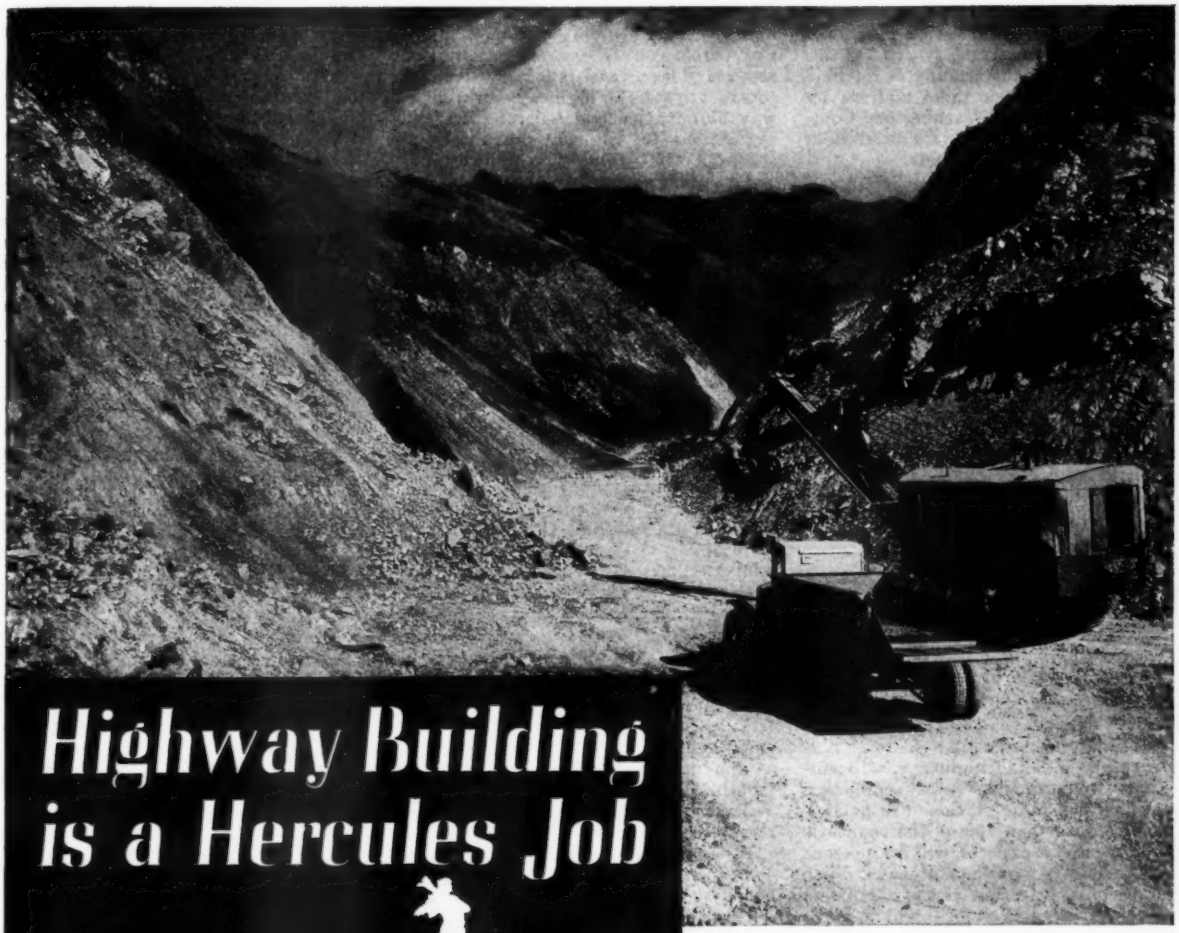
The units, well known throughout the construction world, which form the Interior Construction Company, are: the Mason-Walsh-Atkinson-Kier Company; Morrison Knudsen Company, Boise, Idaho; J. F. Shea Company, San Francisco; Henry J. Kaiser, Oakland, California; Utah Construction Company, Ogden, Utah; and the General Construction Company of Seattle, Washington. Its officers are Henry J. Kaiser, president; Guy F. Atkinson, vice president; Charles Shea, vice president and Tom Walsh, chairman of the board. No secretary or treasurer was announced.

A bid bond of $2,000,000 accompanied the bid, and a $5,000,000 performance bond and a $2,500,000 payment bond must be posted by the successful bidder.

With the awarding of the contract, the successful bidder will receive without cost the aggregate and concrete-mixing plants which MWAK has used in building the foundations. Also, Mason City (the MWAK all-electric camp) and the 31-mile high voltage transmission line will be used by the contractor on the new contract without cost.

Pacific Constructions, Inc., was formed by the following unit companies: Griffith Company, Los Angeles; Lawler & Maguire, Butte, Montana; Shofner-Gordon & Hinman, Denver; Metropolitan Construction Company, Los Angeles; D. W. Thurston, Pasadena, California; American Concrete & Steel Pipe Company, Los Angeles; Hunkin & Conkey, Cleveland, Ohio; and L. E. Dixon Company, Los Angeles. The officers:

• Grand Coulee appeared like this as MWAK forces were winding up their contract 18 months ahead of schedule. The waters of the Columbia River are gradually being allowed to return to the old channel after having been diverted to flow over the foundations at the right in order to permit pouring of mid-stream and east bank foundations. One end of the final dam will rest in the granite cut visible in the background.



Highway Building is a Hercules Job

Again, Hercules explosives have proved their worth—this time, in the heavy rock work on the Carmel-San Simeon section of the marvelous $9,000,000 California coastal route.

Contractor George Pollock, using Hercules explosives exclusively, blasted 163,000 cu. yd. from a massive promontory of granite within a distance of only 1,000 ft. Other contractors, too, relied on Hercules explosives and Hercules technical service on this project.

For highway building and all rock-moving work, get the economy and performance of Hercules explosives and make use of Hercules technical service.

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25th Anniversary Year

HERCULES POWDER COMPANY
Incorporated
972 KING STREET
WILMINGTON, DELAWARE

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For your convenience in writing to Hercules Powder Company, you will find a card bound in this issue.

W. A. Johnson, president; J. C. Maguire, secretary; S. M. Griffith, vice president; Clyde Wood, treasurer.

Ceremonies at the reading of the bids were opened with a radio address by Secretary Ickes in Washington. Commissioner Page then gave a brief talk, and Mr. Banks read the bids.

All Roads Lead to Cleveland

Four hundred exhibits of the very newest and best in road-building machinery and materials will occupy the spotlight at the 1938 Road Show and Convention of the American Road Builders' Association at Cleveland, January 17 to 21. These displays will occupy every foot of available floor space in the Cleveland public auditorium, one of the few halls large enough to house an exposition of such magnitude. Twenty thousand road builders from forty-eight states and twenty-five foreign countries will view these newest developments in power shovels, paving mixers, finishing machines, tractors, trucks, crawler wagons, compressors, graders, rollers, engines, guard-rail and other road-building equipment and materials.

Convention sessions of the Committee on Safe Highways, with the attendant exhibition of equipment used for building safety into the highways, will culminate a nationwide safety campaign in which 354 radio stations are participating. More than 100 of the country's leading safety experts will be present to discuss safety on the highways, which has become, in recent years, a problem of construction. Sessions will also be devoted to the consideration of other currently vital questions, including highway planning, soil stabilization, gas-tax diversion, education of highway engineering students, development of highway construction equipment, highway legislation, federal-aid benefits for secondary roads and municipalities, the contract system in highway work, highway illumination and federal rules and regulations for highway work.

State, county and city highway officials; highway engineers and contractors, manufacturers and distributors will attend and exchange their views on the latest developments and new ideas.

North Atlantic Highway Officials to Meet

The 14th Annual Convention of the Association of Highway Officials of North Atlantic States will be held at the Ambassador Hotel in Atlantic City, February 16, 17 and 18.

An interesting program is being prepared by a committee headed by Nathan L. Smith of Maryland. Other committee members are John V. Keily, Rhode Island; Elmer C. Lawton, New York; James Logan, New Jersey; and Paul Tebbs, Pennsylvania.

W. P. A. Highway Work

The last appropriation for financing W.P.A. activities was for the period ending June 30, 1938, and provides funds at the rate of about $100,000,000 per month. More than one-third of present W.P.A. projects are devoted to road and street improvement and construction.

If, as seems likely, this percentage continues, W.P.A. will spend over $30,000,000 per month on roads and streets during the first six months of 1938. Expenditures after that time, of course, depend on future Congressional action.

Principal emphasis of W.P.A. work has been on the unimproved roads, of which there are an estimated 2,200,000 miles, "serving" about 4,400,000 farm families throughout the country.

Latest official figures (September 15, 1936) show a total of 122,592 miles of road constructed or improved by W.P.A. Of this, 84,218 miles were in the clay, gravel or improved dirt classification, and of the estimated 60,000 miles completed since that time, 50,000 were rural roads. A total of over 40 per cent of the 45,672 road projects placed in operation by W.P.A. during the past two years (exclusive of bridge construction and roadside improvements) have been improvements to county road systems.

Preliminary estimates of road work done by C.W.A. and F.E.R.A., predecessors of the present Works Program, show 47,400 miles of new construction, of which 7,300 miles was paved roads or streets. Total of roads and streets improved or repaired was 602,000 miles.

The Division of Research, Statistics and Records is at present assembling figures on accomplishment under the Federal Works Program for the entire four years it has been in operation. These figures will probably be released early in 1938.

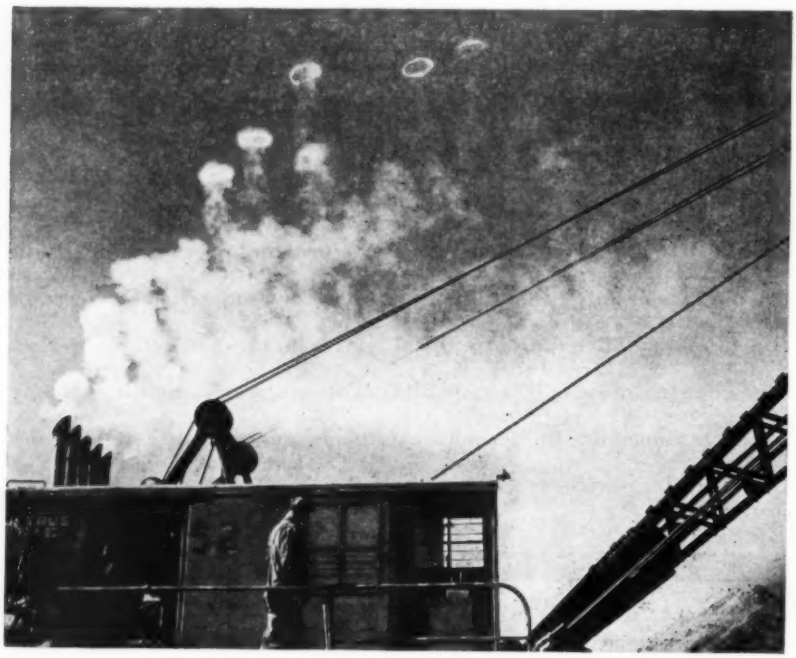
Second Largest Concrete Dam

Revised plans for Shasta Dam, key unit of the vast Central Valley project in California, will make it the second largest concrete dam in the world, according to Bureau of Reclamation reports.

The design calls for a straight-gravity concrete dam approximately 560 feet high and 3,100 feet long, to be erected across the canyon of the upper Sacramento River 13 miles north of Redding, California. Shasta Dam will back up the waters of three rivers—the Sacramento, Pit and McCloud—a distance of 35 miles to create a conservation reservoir with a storage capacity of 4,500,000 acre-feet.

Construction of the dam, designed to bring multiple benefits of improved irrigation, flood control, navigation, salinity repulsion and power generation to California's semi-arid Central Valley, must await prior reconstruction of 37 miles of the Southern Pacific Railroad now located within the proposed reservoir site. Mr. Page said negotiations now under way between the Government and the Southern Pacific probably would reach a satisfactory conclusion in time to start the railroad work soon after the first of the year.

As originally planned by State engineers, Shasta Dam was to be about 500 feet high, creating a reservoir of approximately 3,000,000 acre-feet. On the basis of recent comprehensive studies



• "Smoke rings at dawn" might be the title for this picture. The photographer happened to be on the spot when this J. F. Shea rig started its morning work on the Aqueduct, and he couldn't resist the rings.

READY FOR EVERY RESPONSIBILITY

Grader manufactured by Galion Iron Works and Mfg. Co., Galion, Ohio. Grader is equipped with 12 TIMKEN Roller Bearings in wheels and steering mechanism.

TIMKEN Tapered Roller BEARING EQUIPPED

A symbol of quality for any piece of equipment with which it is associated

No division of industry is more alert to modern needs nor more progressive in meeting them than the manufacturers of road building and maintenance equipment.

The Rock Island "Rockets" Roll On TIMKEN Bearings

GLIDE—as you ride a Timken-equipped train

This is constantly being emphasized by new developments in road machinery, all tending toward the construction of better and better highways at lower and lower cost.

TIMKEN Tapered Roller Bearings are assuming greater and greater importance in these developments as operating speeds are stepped up, capacities increased and greater accuracy demanded. Equipment manufacturers have invariably found them ready to accept every new responsibility with the same old dependability.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; Timken Rock Bits; and Timken Fuel Injection Equipment.

TIMKEN
TAPERED ROLLER BEARINGS

For your convenience in writing to The Timken Roller Bearing Company, you will find a card bound in this issue.

● Wyoming State Highway Department produces 350 to 400 tons of ⅛- to ⅝-inch gravel per 8 hours with this Caterpillar-powered plant. An RD6 and an RD4, pulling rotary scrapers remove spoil and deliver rock to the crusher.

of the economic height, considering the water resources and the manifold requirements, Chief Engineer R. F. Walter of the Bureau of Reclamation approved a recommendation for a reservoir of 4,500,000 acre-feet.

This storage capacity at the selected site requires a dam with a crest elevation 543 feet above the present lowest bedrock determined by foundation exploration. After excavation for the necessary cut-off wall below bedrock, the dam will rise probably about 560 feet above the lowest foundation.

Shasta Dam's only rivals in size will be mighty Boulder Dam on the Colorado River and Grand Coulee Dam under construction on the Columbia River, both under the jurisdiction of the Bureau of Reclamation.

In height, Shasta will be second to Boulder, which is 726.4 feet high. Grand Coulee will be 553 feet high. On the crest, Shasta will be more than twice as long as Boulder—3,100 feet compared to 1,282 feet—but not so long as Grand Coulee's 4,200 feet. In mass, Shasta will require approximately 5,700,000 cubic yards of concrete, which is considerably more than the 4,360,000 cubic yards in Boulder Dam and power house, but not comparable to the 11,250,000 cubic yards now being placed in Grand Coulee Dam and power houses.

Next to these three giants is the Chambon Dam in France, 450 feet high, followed by Hetch Hetchy Dam, a part of San Francisco's water supply system in the Sierra Nevadas, which recently was heightened to 427 feet, and Owyhee Dam in eastern Oregon, another Bureau of Reclamation structure, 417 feet high.

Incidental to the primary functions of Shasta Dam will be the generation of about a billion and a half kilowatt-hours of electricity annually. The initial hydroelectric installation will be for 280,000 kilowatt (375,000 horsepower) capacity, with provision for future enlargement to 350,000 kilowatts (470,000 horsepower).

Shasta Dam will be one of two large concrete dams on the Central Valley project. The other, Friant Dam on the upper San Joaquin River east of Fresno, California, will be 260 feet high and 3,330 feet long, creating a reservoir of 450,000 acre-feet. Shasta and Friant Reservoirs will be operated to conserve and regulate the principal water resources of the combined Sacramento and San Joaquin river valleys to serve a rich agricultural empire partially threatened with reversion to desert by drought and salinity. More than a million acres in the Sacramento and San Joaquin basins face an acute water shortage which is expected to be relieved by the Central Valley project.

International Harvester Expansion

Completion by next May 1 of a large addition to the International Harvester Company's tractor works at 2600 W. 31st Boulevard was announced recently. The new addition, with buildings and equipment, will cost in excess of $1,000,000. The construction job, now under way, when completed will make the company's Chicago tractor works one of the world's largest tractor manufacturing establishments.

The new addition will be devoted entirely to the production of International Harvester's line of crawler-type tractors. This line, known as TracTracTors, is used in both agriculture and industry. Five different-size models will be produced in the enlarged plant, including two models powered by Diesel motors. The Diesel engines will continue to be made in the company's manufacturing works at Milwaukee.

Security Tax Report Changes

Secretary Morgenthau announced recently that after January 1, 1938, monthly tax returns under Title VIII of the Social Security Act will no longer be required, but instead tax returns under this Title are to be made and taxes are to be paid on a quarterly basis.

A Treasury Decision signed by the

OUTSTANDING!
-in digging ability and durability.
No other bucket approaches
The Owen Bucket
in its ability to take "a mouthful at every bite" and serve for extra long periods with freedom from adjustments or repairs.
Write for catalog explaining the exclusive features that make this outstanding performance possible.
The Owen Bucket Co. 6095 Breakwater Avenue Cleveland, Ohio
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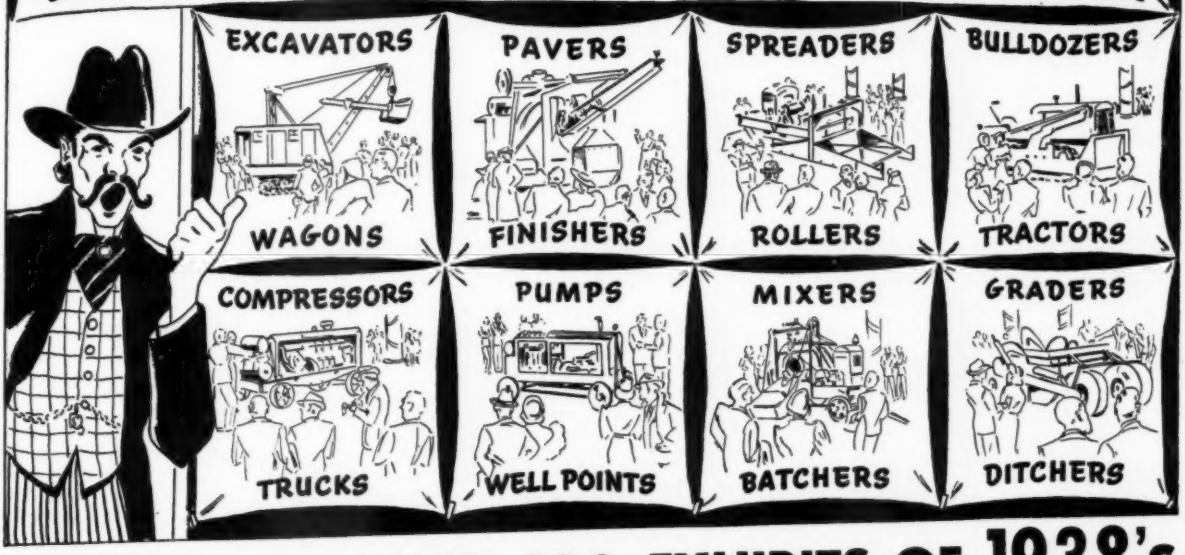
DON'T MISS THE GREATEST SHOW ON EARTH!



THERE'LL BE OVER 400 EXHIBITS OF 1938's NEW CONTRACTING EQUIPMENT, METHODS AND MATERIALS at the 5-STAR ROAD SHOW AND CONVENTION CLEVELAND, JAN. 17-21

RIDE AMERICA'S *NEWEST TRAINS* to the *GREATEST* SHOW ON EARTH!

Chicago, Milwaukee and St. Paul:
THE HIAWATHA
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THE BLACK HAWK
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THE SCOUT
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Illinois Central:
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THE CREOLE
THE GREEN DIAMOND
New York Central:
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EMPIRE STATE EXPRESS
Southern Railway System:
THE FLORIDA SUNBEAM
PONCE DE LEON

See in advance the new 1938 road-building equipment—larger pavers, faster tractors, improved pumps, mixers, excavators, compressors and all other machines that will be out in front in '38's road-building (and contracting) programs.

Get together with the largest group of contractors, engineers and highway officials ever assembled—meet old friends, make new ones. Talk over your problems, get new ideas to help make 1938 your biggest and best construction year!

You'll learn a lot from the informative talks that you'll hear from the country's leading road-building authorities. You'll find that it will be the most worth-while meeting in 1938! So, remember the date and be with the "crowd" at Cleveland when the doors open on the A.R.B.A. Five-Star Road Show and Convention!

AMERICAN ROAD BUILDERS ASSOCIATION
National Press Building, Washington, D. C.

For your convenience in writing to American Road Builders Association, you will find a card bound in this issue.

Commissioner of Internal Revenue and approved by the Secretary authorizing this change provides also that information returns listing employees to whom wages have been paid and the amount paid to them are to be combined in one form with the tax returns.

Prior regulations required that these information returns be made quarterly, but exceptions were made for the calendar year 1937, requiring returns in half-yearly instead of quarterly periods. Information returns were made for the six-months' period which ended June 30 and similar information returns under Form SS-2 must be made for the six-months' period which will end December 31 of this year. Monthly tax returns under Form SS-1 must also be made for each of the months of the present calendar year.

After January 1, 1938, however, each employer liable for the payment of taxes under Title VIII will be required to make only a single return on Form SS-1a in place of the monthly tax return and the quarterly information return now required by the regulations.

Returns, together with tax payments, must be made to Collectors of Internal Revenue in the month of April for the quarter ending March 31, 1938, in July for the quarter ending June 30, in October for the quarter ending September 30 and in January 1939, for the quarter ending December 31, 1938.

Crooked Creek Dam Bids

Bids for construction of an earth fill dam on Crooked Creek, near Ford City, Pennsylvania, were opened on December 17 by the U. S. Engineer's office at Pittsburgh. Major features of the construction, besides the dam itself, are: outlet works, saddle spillway, operating house and installation therein of government-furnished equipment.

Common and borrow pit excavation are estimated at 1,010,000 yards, and rock excavation at 680,000 yards. In addition, 17,000 yards of tunnel excavation will be required in connection with the outlet works.

950,000 yards of rolled fill will be placed in the embankment and a total of 495,000 yards of rock must be placed in embankment and stream channel.

Work must be commenced within 10 days after receipt of notice to proceed, and must be finished within 1096 calendar days after receipt of such notice.

Award of the contract had not been announced at the time this issue went to press.

Gatke Expands Warsaw Plant

On September 14th one of the Gatke Corporation's factories, located at Warsaw, Indiana, was damaged by fire. Immediately the necessary steps were taken to place the plant back on its normal manufacturing schedule so that customers would not be inconvenienced by delayed shipments. Conveniently located warehouses materially assisted in maintaining prompt service.

This plant has not only been returned to its normal capacity but the manufacturing facilities have been greatly increased and improved. One of the outstanding features of this plant is its ability to handle all types and sizes of frictional requirements. Clutch Discs 14 feet in diameter for the world's largest mine hoist were designed by Gatke engineers and built in this plant.

National Paving Brick Meeting

The 32nd Annual Meeting of the National Paving Brick Association will be held at Cincinnati, Ohio, January 12, 13 and 14, 1938, at the Netherland Plaza Hotel.

The program, now in preparation, will include papers and discussions by prominent engineers and contractors experienced in the use of brick for paving purposes. Important recent developments in manufacturing, in the technique of testing and in construction practices will be considered. The relationship of the brick type of pavement to the highway problem of the present and future will be an important theme of the convention. This will involve the contribution that brick can make to highway safety; and its adaptability as a heavy duty type to the express or limited traffic way era now in its early stages.

"TIE-UP Prevention"

● Every construction man knows the severe costs of tie-ups on any equipment. When earth movers stop even for brake adjustment, profits drop. But Gatke Asbestos Moulded Brake Blocks and Lining developed for this very field, are insurance against delays due to brake failures.

It is furnished in any thickness and length to meet the requirements of power shovels, hoists, cranes, drag-lines and similar equipment.

Gatke engineers will gladly cooperate. Write them today.

Gatke Double Cone Type Friction Blocks

● Gatke Asbestos Moulded Brake and Friction Blocks

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● Gatke Heavy Duty Woven Brake Lining

The originators of Moulded Automotive Brake Lining

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228 N. La Salle Street Chicago, Illinois

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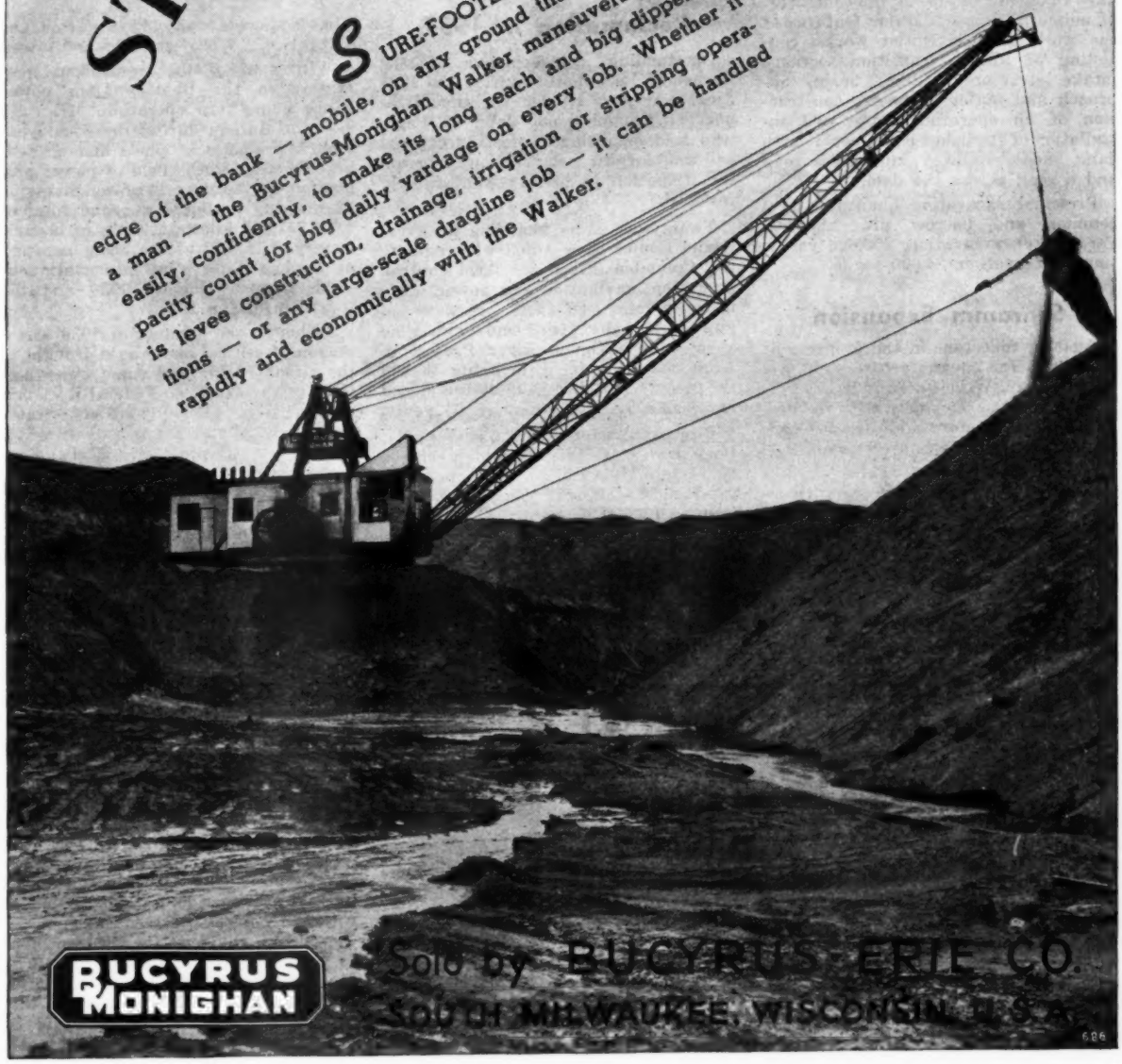
STEPS around TROUBLE

SURE-FOOTED, right up to the edge of the bank — mobile, on any ground that will support a man — the Bucyrus-Monighan Walker maneuvers rapidly, easily, confidently, to make its long reach and big dipper capacity count for big daily yardage on every job. Whether it is levee construction, drainage, irrigation or stripping operations — or any large-scale dragline job — it can be handled rapidly and economically with the Walker.



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SOUTH MILWAUKEE, WISCONSIN, U. S. A.

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• Measuring 460 feet from curb to curb, and 25 blocks long, the new Avenido 9 de Julio in Buenos Aires will be the widest street in the world when completed. The signboard gives an idea of the appearance the street will have. The shovels working to make it look that way are a 16 RB, owned by Luis Bozzini e Hijo, and a Bucyrus-Erie D-2, owned by GEOPE. More details of this interesting job will be given in a later issue.

Bids Opened for Tionesta Dam

U. S. Engineer's office at Pittsburgh opened bids for construction of Tinesta flood control dam on December 18. No information regarding award of the contract had been made prior to the time of going to press.

Located near Tionesta, Pennsylvania, this dam will be an earthfill structure which must be finished in 1096 calendar days following receipt by the contractor of notice to proceed. Major features of the work include: Outlet works, consisting of tunnel, transition sections, intake structure, stilling basin, approach and outlet channels; construction of an operating house and installation of furnished equipment; earth dam; saddle spillway; an access road and a road across the dam.

Principal excavation quantities are: common and borrow pit, 1,850,000 yards; rock excavation, 456,600 yards; tunnel excavation, 34,000 yards.

Schramm Expansion

Another milestone in the progress of Schramm, Inc., manufacturers of Air Compressors, West Chester, Pa., is evidenced by the completion of a new 25,000 sq. ft. factory addition, to mark their thirty-seventh anniversary.

The new addition is located directly next to their present three story structure, where the company has been doing business for twenty years.

Expansion of all departments to meet the demand for Schramm's new "Utility" Compressor is largely responsible for the new Factory addition at this time.

Reclamation in 1937

Outstanding achievements of the Bureau of Reclamation during the 1937 fiscal year were cited in the annual report of Commissioner John C. Page, who said operating projects prospered and the largest construction program for irrigation in history went rapidly forward.

Twenty-one dams, including the great Grand Coulee dam which will regulate the Columbia River for flood control, irrigation, navigation and power, were in construction. Of these, six were begun during the year. One dam, Pine View on the Ogden River Project in Utah, was completed, bringing to 138 the grand total of dams built and placed in service by the Bureau in 35 years.

Crop results for the 1936 season, Mr. Page said, established new high records on same and for all projects amounted to $136,502,480, or $29,721,186 more than in 1935. This total represented an average return of $47.10 for each of the 2,901,919 acres served with water in the West by the Bureau. Only three previous years, 1929, 1928 and 1919, showed better results.

Federal irrigation projects supported 210,466 persons on 48,773 farms and 653,441 in 257 project cities and towns.

With four of the tremendous generators in the Boulder Dam power house going into operation, Mr. Page said the Bureau during the fiscal year took a pre-eminent place among Federal agencies in the field of power production. In the year 24 power plants on 12 projects produced a grand total of 1,056,757,865 kilowatt hours of electric energy. The first of the big generators at Boulder Dam went into continuous production in October 1936 and the fourth in March 1937.

Although the summer of 1936 was a season of critical and tragic drought in the Great Plains and some other sections of the West, no Federal Reclamation project suffered serious water shortages. Abundance of stored water protected most projects, Mr. Page reported. Only on the Belle Fourche project in South Dakota and on the North Platte project in Wyoming and Nebraska, in the heart of the Great Plains area, was it necessary to curtail water deliveries.

Deficient rainfall for a number of years over vast areas of the West served to emphasize the need for new projects to stabilize farming communities now without stored water supplies and to provide new opportunities for those forced to abandon their homes because of drought. An extensive program of Secondary Investigation to determine the feasibility of proposed new projects was under way.

While several major investigations of this type were in progress, the most noteworthy to be completed was that of the proposed Colorado-Big Thompson project in Colorado, by which surplus waters from the western slope of the Continental Divide to the Eastern Slope to supplement the irrigation supply of the important South Platte Valley area. The report on this project found that 310,000 acre-feet of water could be transported, principally by means of a

SAUERMAN
LONG RANGE MACHINES

When you have a problem of handling sand, gravel, clay, loose ore, coal, etc. over any length of haul from 100 to 1500 ft., it is economy to use a machine that digs, hauls and places the materials in one operation. Try a Sauerman Slackline or Drag Scraper on your long range material-handling work.

SAUERMAN BROS.
474 S. Clinton St. CHICAGO

Visit the Sauerman exhibit at the Road Show in Cleveland, January 17-21.

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WON'T QUIT OR CAUSE TIME OUT

A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.

THE HAYWARD COMPANY
52-54 Church Street
New York, N. Y.

Here Is a Bargain
in used excavating equipment

(taken from page 76)

BUCYRUS-ERIE 16-B gasoline shovel. Waukesha 6MS—6-cylinder 3¾"x4¾" engine. Electric starter. Good operating and mechanical condition. Located Wisconsin. Box 1198-SS.

For other bargains in shovels, draglines, cranes, locomotives, trenchers, and miscellaneous contractors' equipment turn to pages 76 to 80.

The largest listing of Used Equipment offered by any Publication Serving the Excavating Industry.

Move More Dirt

BUILT of special, tough, lightweight, alloy steel, Bucyrus-Erie dippers offer unique fast-digging features that give you greater yardage. Welded lightweight, big-capacity dippers for lighter types of digging and extra-strong heavy-duty cast dippers for tough digging are available. Write for complete information on these dependable, yardage-producing dippers —sizes from ⅜ to 33 yards.

Speed-Type Welded Dipper

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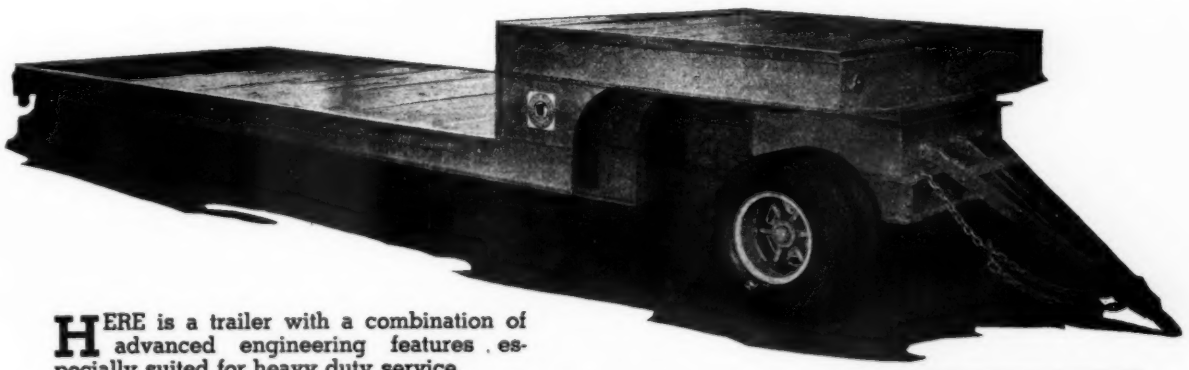
EXCAVATING, DRILLING & MATERIAL HANDLING EQUIPMENT
SOUTH MILWAUKEE, WISCONSIN

"JAHN" TRAILERS ARE BUILT TO TAKE IT!



HERE is a trailer with a combination of advanced engineering features especially suited for heavy duty service.

Look at the double reenforced "goose-neck" construction. This, combined with an unusually rigid "X" type frame, eliminates any possibility of frame sagging or kingpin failure. Recessed flooring protects ends of planking from splintering.

Equal load distribution is accomplished by multiple rear axles consisting of four oscillating type axles placed in dual tandem. Axles are designed and built with the problems of frame stresses definitely in mind and to assure the proper distribution of load and the elimination of frame distortion and frame failure.

If you're in the market for a heavy duty machinery trailer, don't fail to investigate the features these trailers offer.

Write or wire —

This is only one of the many Jahn trailers. Jahn trailer designs include complete combinations of wheel arrangements for every type of load, from 5 to 100 ton capacities.

C. R. JAHN COMPANY, 1312 Builders Bldg., Chicago, Ill.

For your convenience in writing to the advertisers on this page, you will find a card bound in this issue.

13 mile tunnel, and delivered to the thirsty lands for $2.00 a year per acre-foot.

At Grand Coulee Dam construction records made at Boulder Dam were broken. The base of the dam, covered in the contract in force, was 54 percent completed at the start and 82 percent completed at the close of the fiscal year. Construction was about a year ahead of schedule. With more than 6,000 men at work, in excess of 2,000,000 cubic yards of concrete were placed. A new record for concrete placement in one day was established on June 24 when 13,002 cubic yards were manufactured and poured into the dam. The Columbia River, second largest in the Nation, was diverted from its course at the dam site and the channel of the stream successfully unwatered with one of the major engineering achievements of modern times, completion of the cross-river cofferdams.

Preliminary engineering work was completed on most of the major features of the Central Valley Project in California, and six construction contracts were awarded during the year. Detailed plans for Friant Dam, on the San Joaquin River, were in preparation and the site for Shasta Dam on the Sacramento River was selected and approved.

Work in progress at Boulder Dam consisted of installation of power machinery and power house equipment.

Contracts covering excavation of the entire length of the All-American Canal were in force by the close of the fiscal year. Imperial Dam and the desilting works which will head the 80-mile canal, America's largest irrigation ditch, were under construction.

Mr. Page, in his report this year, again noted that accretions to the Reclamation Fund were declining. When it was established in 1902, the sale of public lands was expected to provide this special fund with a substantial amount annually. From a high of $9,430,573.98 reached in 1902, accretion from this source fell this year to a low of $127,176.17.

"This source of revenue can not be revived," Mr. Page said, " because of new conservation policies and exhaustion of attractive farm sites on the public domain.

"Again the need for new sources of accretion to the fund must be stressed. While the fund also receives repayments made by water users on operating projects, this source and the remaining productive statutory source of accretion can not be expected to provide sufficient money year by year to finance reclamation construction programs of the size of that now in progress."

● Quite different from the usual ukulele-strumming or surf-riding picture is this scene in Hawaii. A fleet of "Caterpillar" Diesel tractors is the principal power supply for an extensive road-building program on the island. Here one of the Diesels equipped with a bulldozer is at work on construction of a road to Fort Weaver. The Hawaiian Contracting Company of Honolulu is in charge of the work.

Safety Competition Winners

Recognition of outstanding achievement in the prevention of accidents among mine and quarry workers in the United States was given in the announcement of the winners in the National Safety Competition of 1936, made recently by Dr. John W. Finch, Director, U. S. Bureau of Mines, Department of the Interior.

Three hundred and twenty-eight mines and quarries operating in thirty-six States took part in this, the twelfth annual contest conducted by the Bureau of Mines.

Four underground mines and one open-pit mine, each a leader in its group, were awarded the "Sentinels of Safety" trophy, donated by the Explosives Engineer magazine. Relative standing in the contest was based on the number of days lost from accidents in proportion to the total number of man-hours worked.

Three bituminous-coal mines, 6 nonmetal mines, 9 metal mines and 66 quarries and open-pit mines were operated during the contest year without a lost-time injury to any of the employees.

The Mesabi Chief iron-ore mine, Keewatin, Itasca County, Minnesota, was awarded the trophy in the quarry and open-pit mine group. The mine was operated by the Hanna Ore Mining Company and worked 308,188 manhours during 1936 without a lost-time accident and was active 185 days.

Trailer Firm Moves

The C. R. Jahn Company, manufacturers of heavy duty and single purpose trailers, announces removal to new and larger plant quarters at 1351 W. 37th Place, Chicago. Facilities provide for complete control of assembly and shipment with inside rail loading.

General sales offices are still located at 228 N. La Salle St., Chicago.

HOLD your line TIGHT

with—

Bulldog
ROPE SOCKETS

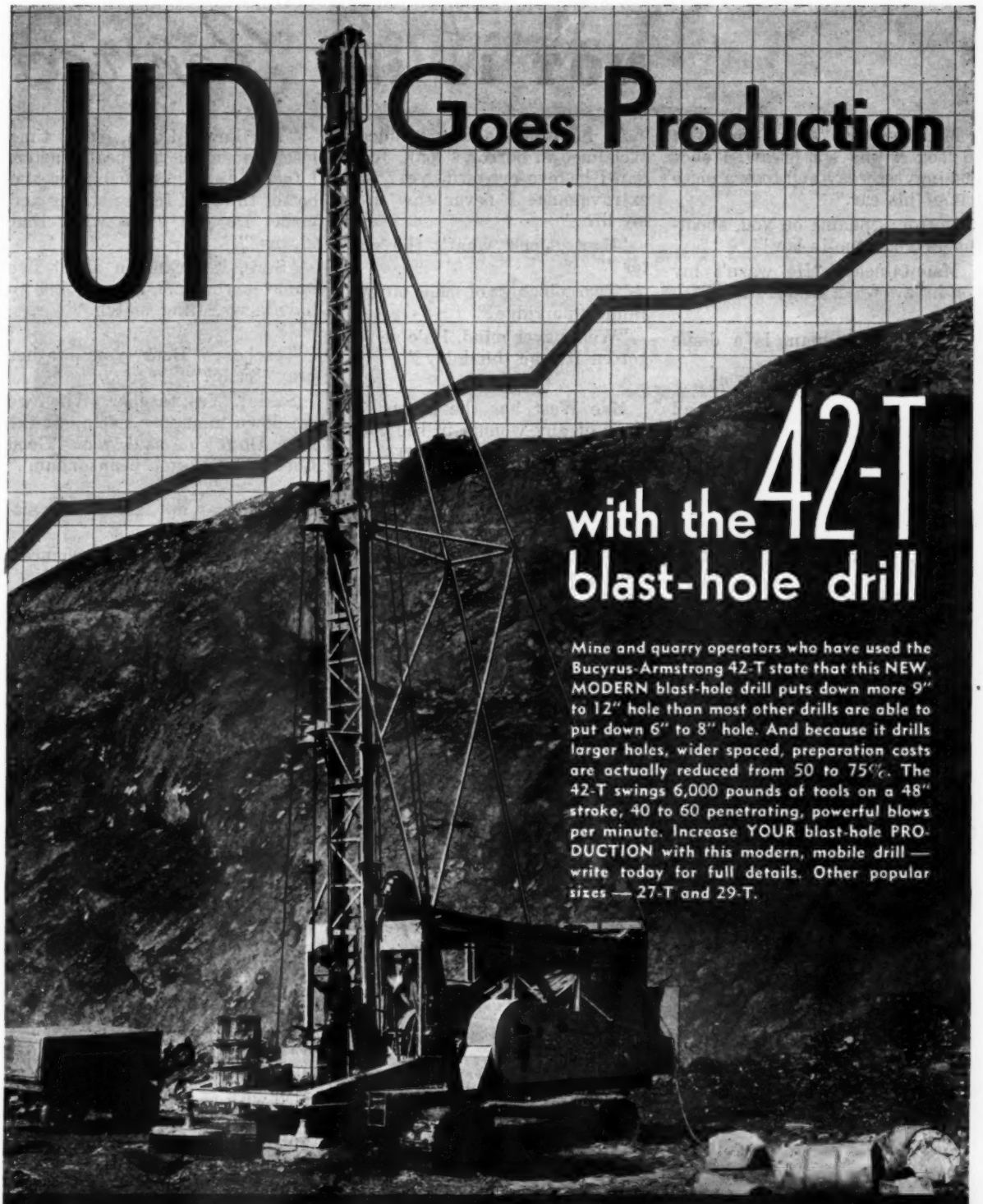
BULLDOG Wedge Rope Sockets *never let go!* The rope pulls the wedge tightly into the tapered socket ... and the harder the pull ... the tighter the grip. Anyone can apply these sockets ... easily, quickly, and safely. The rope pulls directly in line with point of attachment. Made in four styles and more than a dozen sizes. Send for bulletin. 224

BUCYRUS ERIE

BUCYRUS-ERIE

EXCAVATING, DRILLING & MATERIAL-HANDLING EQUIPMENT • • SOUTH MILWAUKEE, WIS.

For your convenience in writing to Bucyrus-Erie Co., you will find a card bound in this issue.


UP Goes Production
with the 42-T
blast-hole drill
Mine and quarry operators who have used the Bucyrus-Armstrong 42-T state that this NEW, MODERN blast-hole drill puts down more 9" to 12" hole than most other drills are able to put down 6" to 8" hole. And because it drills larger holes, wider spaced, preparation costs are actually reduced from 50 to 75%. The 42-T swings 6,000 pounds of tools on a 48" stroke, 40 to 60 penetrating, powerful blows per minute. Increase YOUR blast-hole PRODUCTION with this modern, mobile drill — write today for full details. Other popular sizes — 27-T and 29-T.
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DRILLING, EXCAVATING, AND MATERIAL HANDLING EQUIPMENT... SOUTH MILWAUKEE, WISCONSIN, U. S. A.
715

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NOT in the *Contract*

Mountaineer: "Doc, I want you to look at my son-in-law. I shot at him yesterday and took a piece out of his ear."

Doctor: "Shame on you, shooting at your son-in-law!"

Mountaineer: "He wasn't my son-in-law when I shot him."

The average man, is a dame fool.

Many people can remember all the details of a joke except the names of the people they've already told it to.

At breakfast a Scot suddenly exclaimed in horror, "Jean, Jean! Can I believe my own eyes? Sich extravagance I never saw in a' my life!"

"Hoots, Jock, what's the matter?"

"Two pinches of salt on wee Jamie's porridge!"

"Well, never mind, Ha'e ye forgotten it's his birthday?"

Mae West has the largest income of any woman in the country—making three spheres in which she excels.

JASPER **By Frank Owen**

Reprinted with permission of United Feature Syndicate.

"Here he is, lady!"

"You know, Edith, every time I see you my heart beats faster. I feel the urge to do bigger and better things, I feel so strong and virile. Do you know what that means?"

"Sure, it means in about five minutes you and I are going to have a wrestling match."

Teacher: "Does your father pray, Susie?"

Susie: "Yes, teacher. When we sat down to supper last night the first thing he said was, 'Good Lord! We've got beans again'."

"You're an apt lad. Is your sister apt, too?"

"Yes, sir, if she gets a chance."

Frowsy Gent: This liquor won't cause any damage to my eyes, will it?

Husky Bartender: Not if you've got the money to pay for it!

I sneezed a sneeze into the air;
It fell to ground I knew not where;
But hard and cold were the looks
of those
In whose vicinity I snoze.

"Is your wife home?"

"Naw," replied Finkle, "she's out with a bunch of prize fighters."

"Prize fighters?" exclaimed Funkle.

"Yes," replied Finkle, "she went to a bridge party."

The house guests were assembled with their hosts in the living room after dinner, chatting pleasantly, when the 5-year-old daughter of the host appeared suddenly in the room, her clothes dripping with water. She could scarcely articulate, so great was her emotion and her parents arose in consternation as she entered.

"You—you," the little girl babbled, pointing to the male of the house guests, "you are the one who left the seat up."

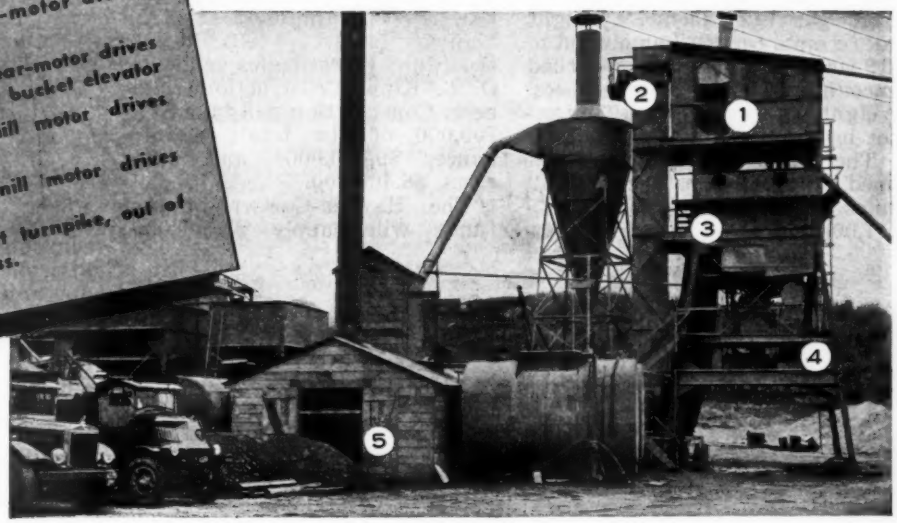
Bringing Boston ½ Hour Closer to the North Country

G-E Motors and Control Provide Speed and Assure Dependable Operation for this Modern Asphalt Plant

This 1000-ton-per-day asphalt plant is operated by G-E motors with suitable control at five vital points:

1. 15-hp general-purpose motor drives vibrating screen
2. 15-hp gear-motor drives bucket elevator
3. 7 1/2 hp gear-motor drives dirt worm and bucket elevator
4. 100-hp mill motor drives mixer
5. 50-hp mill motor drives stone dryer

Newburyport turnpike, out of Boston, Mass.



MAKING use of modern equipment, the Warren Brothers Road Company repaved the old Newburyport 30-foot turnpike out of Boston and widened it to 108 feet.

This project means a saving of half an hour for motorists between Boston and the country to the north. It means greater safety because of eight-lane width, the opposite-bound traffic lanes being separated by a turf center strip. To provide a constant supply of uniform-quality asphalt, the contractors built an electrically operated plant which produced 1000 tons per 10-hour day without a single interruption due to motor or control maintenance or failure.

For construction projects of any kind that you undertake, consult the nearest G-E representative regarding the effective application of General Electric equipment to speed the job. General Electric, Schenectady, N. Y.

YOU GET SPEED FOR THE JOB, MORE SERVICE FOR YOUR MONEY, WHEN YOU SPECIFY G-E EQUIPMENT

GENERAL ELECTRIC

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For your convenience in writing to General Electric, you will find a card bound in this issue.

1938 Highway Forecast

(Continued from page 25)

Commissioner in charge of Construction and Operation, the total of $18,176,863 which Michigan will have available for highway work in 1938 closely approximates the funds used last year. Construction will require $13,176,863 and maintenance an additional $5,000,000.

Revenues will be obtained as follows: Hayden-Cartwright Act, $3,796,028; Federal grade crossing and Secondary funds, $2,-084,807; state gas tax, $10,796,-028. The General fund will supply an additional $1,500,000 to make the full allotment guaranteed to the Highway Department from gas tax income. Weight tax receipts for 1937 amounted to $19,500,000, which was returned to counties for highway purposes. Weight tax receipts for 1938 cannot be estimated at this date.

The following schedule is outlined for 1938 construction: 79 miles of grading involving 2,-217,000 yards of material, $1,-365,000; 226 miles of gravel or crushed stone surfacing requiring 932,250 tons of material, $2,-520,000; 126 miles of high type paving, $4,777,056; 225 miles of low type paving, $1,420,000; and 39 bridges and grade separations amounting to $3,094,807. About 1,610,000 yards of previously awarded excavation, costing $402,000, will be carried over into 1938.

No highway funds were diverted in Michigan in 1937.

Minnesota

A 6 per cent decrease from last year gives Minnesota a 1938 highway budget of $27,100,000, according to estimates made by O. L. Kipp, Construction Engineer. Construction will take $11,-700,000 of the total; maintenance, $9,000,000; and other costs, $6,400,000.

The Hayden-Cartwright Act funds will supply $5,500,000; state gas tax, $11,500,000; and vehicle license fees and other sources, $10,100,000. Preliminary schedules indicate the following division of construction funds: 300 miles of grading, $2,500,000; 300 miles of gravel or crushed stone surfacing, $1,300,000; 75 miles of high type paving, $2,-250,000; 300 miles of low type paving, $1,300,000; and 25 bridges amounting to $1,650,000. About 2,000,000 yards of previously awarded excavation, costing $600,000, will be carried over into 1938.

Minnesota reports no diversion of highway funds in 1938.

● Harry T. Campbell & Sons Bucyrus-Erie 43-B is shown here loading a Koehring Dumptor equipped with Goodyear Tires. The outfit is working on a highway job near Harrisburg, Pennsylvania. An article on this interesting operation will appear in an early issue.

Mississippi

With a reduction of 60 per cent in highway funds, Mississippi will have $7,325,000 as its construction budget in 1938 according to R. A. Harris, Chief Engineer, State Highway department. This sharp decrease is mainly due to the curtailment of PWA activities which have been carried on for the past two years.

The total sum will be realized if the 1938 legislature allocates approximately $2,500,000 to match Federal funds. Sources of income will be: Regular Federal Aid matched by the state gas tax, Federal grade crossing and secondary road allocations.

Division of construction funds

Diversion of Receipts from State Taxes on Highway Users—1936

Source: U. S. Bureau of Public Roads

	Net Receipts	Diverted	Percentage
Alabama	$ 16,091,000	$ 725,000	4.5
Arizona	5,021,000	7,000	.14
Arkansas	12,067,000	77,000	.64
California	66,837,000	5,427,000	8.12
Colorado	9,990,000		
Connecticut	15,082,000	123,000	.82
Delaware	2,958,000		
Florida	26,126,000	7,802,000	29.86
Georgia	19,195,000	2,901,000	15.11
Idaho	5,993,000		
Illinois	53,229,000	7,412,000	13.92
Indiana	30,839,000	3,356,000	10.88
Iowa	23,489,000		
Kansas	14,414,000		
Kentucky	16,177,000	799,000	4.94
Louisiana	16,323,000	3,487,000	21.36
Maine	8,807,000		
Maryland	13,665,000	538,000	3.94
Massachusetts	25,327,000	6,126,000	24.19
Michigan	45,957,000	342,000	.74
Minnesota	20,537,000	194,000	.94
Mississippi	11,031,000		
Missouri	20,727,000	66,000	.32
Montana	6,222,000		
Nebraska	13,478,000	2,238,000	16.61
Nevada	1,558,000		
New Hampshire	5,819,000		
New Jersey	37,036,000	13,275,000	35.84
New Mexico	4,877,000	480,000	9.84
New York	102,000,000	59,790,000	58.63
North Carolina	28,725,000	2,432,000	8.47
North Dakota	3,806,000	5,000	.13
Ohio	67,434,000	11,470,000	17.00
Oklahoma	18,963,000	3,882,000	20.47
Oregon	13,062,000	238,000	1.84
Pennsylvania	84,719,000	12,607,000	14.87
Rhode Island	4,837,000	1,995,000	41.38
South Carolina	11,697,000	154,000	13.18
South Dakota	6,205,000	2,131,000	32.65
Tennessee	22,187,000	3,654,000	16.51
Texas	56,278,000	9,307,000	16.66
Utah	4,269,000	45,000	.11
Vermont	4,522,000		
Virginia	20,606,000	30,000	.14
Washington	17,522,000	942,000	5.37
West Virginia	12,714,000		
Wisconsin	31,385,000	4,355,000	13.91
Wyoming	2,969,000		
District of Columbia	3,569,000	932,000	25.92
Total U. S.	$1,066,341,000	$169,344,000	Av. 13.61

• Hardaway Contracting Company paves a road near Hadleysburg, Mississippi with this new Koehring 34-E dual drum paver.

will probably be as follows: 190 miles of grading involving 3,000,000 yards of material, $6,500,000; 250 miles of all types of paving, $4,250,000; and grade separation projects, $1,600,000. About 7,500,000 yards of previously awarded excavation, totalling $1,650,000, will be carried over into 1938.

There was no diversion of highway funds in Mississippi in 1937.

Missouri

Missouri will spend approximately $30,850,000 for highway work in 1938 according to a preliminary report prepared by C. W. Brown, Chief Engineer, State Highway Department. This allows for a program equivalent to that undertaken in 1937.

Sources of revenue are: Hayden-Cartwright Act, $6,150,000; state funds, $4,500,000; state gas tax, $12,300,000; and vehicle license fees and other, $9,640,000. Construction work will require $10,650,000 of the total; maintenance $5,200,000; and retirement of bonds, administration and highway patrol, $15,000,000.

Construction funds will be divided as follows: 305 miles grading involving 5,375,000 yards of material, $3,019,500; 235 miles of gravel or crushed stone surfacing requiring 431,269 tons of material, $510,000; 90 miles of high type paving, $3,546,000; 120 miles of low type paving, $1,485,700; and 80 bridges costing $2,088,800. Carry-over excavation is estimated at 650,000 yards at a cost of $2,000,000.

No highway funds were diverted in 1937.

There was an increase of 344 in the total number of highway grade-crossing accidents during 1936 as compared with 1935. Study of the 4,277 collisions, which killed 1,786 persons, reveals the following facts:

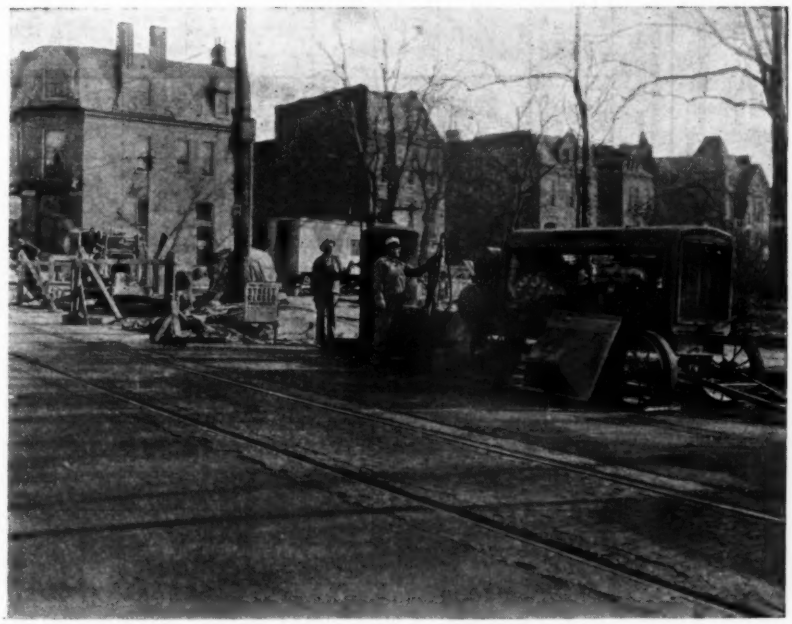
1. Of the motor vehicles involved in crossing accidents, 78.08 per cent were passenger cars, 21.23 per cent trucks, 0.37 per cent buses, and 0.32 per cent motorcycles.
2. December was the month of most accidents, Saturday the worst day, and from 11 p. m. to midnight the worst hour.
3. Crossing accidents were almost equally divided between night and day, but night accidents increased over 1935 at nearly twice the rate of increase for day accidents.

Montana

Total available highway funds for Montana will be about $7,055,000 in 1938, a decrease of 17½ per cent, according to figures released by W. O. Kivley, Office Engineer.

Sources of funds are as follows: Hayden-Cartwright Act, $2,300,000; other Federal funds, $15,000; state gas tax, $4,500,000; and other state funds, $240,000. The funds will be allocated to construction, $3,500,000; maintenance, $2,100,000; and other work, $1,455,000. There will be a carry-over of 2,240,000 yards of excavation at a cost of $406,000.

Construction funds are to be



• Safety and modernization programs involve street-widening, cutting back curb-corners, etc., as well as building new high-speed highways. This Gardner-Denver compressor is furnishing air for a street-widening job in St. Louis, Missouri.

EXISTING STATE HIGHWAY MILEAGE—1936

REPORTED BY U. S. BUREAU OF PUBLIC ROADS

STATE	TOTAL EXISTING MILEAGE: ROADS AND STREETS UNDER STATE CONTROL (COL. 2 + COL. 5)	TOTAL EXISTING MILEAGE: RURAL ROADS UNDER STATE CONTROL: TOTAL RURAL ROADS (COL. 3 + COL. 4)	PRIMARY STATE ROAD SYSTEM	SECONDARY ROAD SYSTEM 2/	URBAN EXTENSIONS OR CONNECTING STREETS: ON DESIGNATED STATE SYSTEM	NOT ON DESIGNATED STATE SYSTEM	TOTAL INCLUDING CONNECTING STREETS NOT ON SYSTEM (COL. 1 + COL. 6)	SURFACED ROAD MILEAGE: ROADS AND STREETS UNDER STATE CONTROL (COL. 9 + COL. 12)	RURAL ROADS UNDER STATE CONTROL: TOTAL	PRIMARY STATE ROAD SYSTEM	SECONDARY ROAD SYSTEM 2/	URBAN EXTENSIONS ON DESIGNATED STATE SYSTEM	NON-SURFACED ROAD MILEAGE: ROADS AND STREETS UNDER STATE CONTROL (COL. 14 AND COL. 17)	RURAL ROADS UNDER STATE CONTROL: TOTAL	PRIMARY STATE ROAD SYSTEM	SECONDARY ROAD SYSTEM 2/	URBAN EXTENSIONS ON DESIGNATED STATE SYSTEM	STATE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	
ALABAMA	6,500	6,256	6,256	-	244	-	6,500	4,388	4,145	4,145	-	243	2,112	2,111	2,111	-	1	ALABAMA
ARIZONA	3,490	3,459	3,459	-	31	-	3,490	2,668	2,637	2,637	-	31	822	822	822	-	-	ARIZONA
ARKANSAS	9,170	8,996	8,996	-	174	-	9,170	8,370	8,196	8,196	-	174	800	800	800	-	-	ARKANSAS
CALIFORNIA	13,582	12,554	12,554	-	1,028	5	13,587	12,851	11,838	11,838	-	1,013	731	716	716	-	15	CALIFORNIA
COLORADO	9,439	9,346	3,523	5,823	93	-	9,439	5,892	5,799	3,155	2,644	93	3,547	3,547	368	3,179	-	COLORADO
CONNECTICUT	2,699	2,546	2,546	-	153	19	2,718	2,608	2,455	2,455	-	153	91	91	-	-	-	CONNECTICUT
DELAWARE	3,862	3,836	1,702	2,134	26	25	3,887	1,728	1,702	1,702	-	26	2,134	2,134	-	2,134	-	DELAWARE
FLORIDA	12,430	11,935	11,935	-	495	-	12,430	7,767	7,278	7,278	-	489	4,663	4,657	4,657	-	6	FLORIDA
GEORGIA	9,880	9,792	9,792	-	88	-	9,880	5,811	5,742	5,742	-	69	4,069	4,050	4,050	-	19	GEORGIA
IDAHO	4,941	4,758	4,758	-	183	-	4,941	3,661	3,482	3,482	-	179	1,280	1,276	1,276	-	4	IDAHO
ILLINOIS	10,980	10,327	10,327	-	653	141	11,121	10,783	10,138	10,138	-	645	197	189	189	-	8	ILLINOIS
INDIANA	9,819	9,355	9,355	-	464	-	9,819	9,300	8,836	8,836	-	464	519	519	519	-	-	INDIANA
IOWA	9,328	8,318	8,318	-	1,010	-	9,328	9,151	8,146	8,146	-	1,005	177	172	172	-	5	IOWA
KANSAS	9,614	9,095	9,095	-	519	-	9,614	7,381	6,886	6,886	-	495	2,233	2,209	2,209	-	24	KANSAS
KENTUCKY	8,720	8,720	8,720	-	(3/)	-	8,720	7,838	7,838	7,838	-	-	882	882	882	-	-	KENTUCKY
LOUISIANA	17,987	17,746	4,448	13,298	241	-	17,987	13,286	13,052	4,401	8,651	234	4,701	4,694	47	4,647	7	LOUISIANA
MAINE	8,350	8,212	2,519	5,693	138	11	8,361	7,041	6,904	2,438	4,466	137	1,309	1,308	81	1,227	1	MAINE
MARYLAND	3,985	3,929	3,929	-	56	-	3,985	3,985	3,929	3,929	-	56	-	-	-	-	-	MARYLAND
MASSACHUSETTS	1,874	1,720	1,720	-	154	247	2,121	1,874	1,720	1,720	-	154	-	-	-	-	-	MASSACHUSETTS
MICHIGAN	9,528	8,485	8,485	-	1,043	2	9,530	8,847	7,809	7,809	-	1,038	681	676	676	-	5	MICHIGAN
MINNESOTA	11,347	10,934	10,934	-	413	-	11,347	10,870	10,459	10,459	-	411	477	475	475	-	2	MINNESOTA
MISSISSIPPI	6,174	6,023	3,929	2,094	151	4	6,178	5,965	5,817	3,740	2,077	148	209	206	189	17	3	MISSISSIPPI
MISSOURI	14,348	14,305	8,167	6,138	43	38	14,386	13,817	13,777	8,039	5,738	40	531	528	128	400	3	MISSOURI
MONTANA	5,525	5,496	5,111	385	29	4	5,529	4,670	4,642	4,257	385	28	855	854	854	-	1	MONTANA
NEBRASKA	11,129	10,534	10,534	-	595	-	11,129	7,565	7,140	7,140	-	425	3,564	3,394	3,394	-	170	NEBRASKA
NEVADA	4,947	4,923	2,730	2,193	24	-	4,947	2,547	2,524	2,413	111	23	2,400	2,399	317	2,082	1	NEVADA
NEW HAMPSHIRE	3,370	3,370	1,427	1,943	-	99	3,469	3,370	3,370	1,427	1,943	-	-	-	-	-	-	NEW HAMPSHIRE
NEW JERSEY	1,922	1,379	1,379	-	543	50	1,972	1,833	1,332	1,332	-	501	89	47	47	-	42	NEW JERSEY
NEW MEXICO	12,267	12,114	12,114	-	153	-	12,267	3,887	3,758	3,758	-	129	8,380	8,356	8,356	-	24	NEW MEXICO
NEW YORK	13,907	13,907	13,907	-	-	793	14,700	12,565	12,565	12,565	-	-	1,342	1,342	1,342	-	-	NEW YORK
NORTH CAROLINA	58,232	57,857	10,875	46,982	375	481	58,713	29,510	29,136	10,124	19,012	374	28,722	28,721	751	27,970	1	NORTH CAROLINA
NORTH DAKOTA	7,352	7,337	7,337	-	15	12	7,364	6,295	6,280	6,280	-	15	1,057	1,057	1,057	-	-	NORTH DAKOTA
OHIO	16,879	14,593	14,593	-	2,286	-	16,879	16,667	14,398	14,398	-	2,269	212	195	195	-	17	OHIO
OKLAHOMA	8,234	8,234	8,234	-	-	162	8,396	6,713	6,713	6,713	-	-	1,521	1,521	1,521	-	-	OKLAHOMA
OREGON	6,868	6,728	4,618	2,110	140	-	6,868	5,774	5,634	4,127	1,507	140	1,094	1,094	491	603	-	OREGON
PENNSYLVANIA	38,095	35,631	12,982	22,649	2,464	-	38,095	29,494	27,124	12,148	14,976	2,370	8,601	8,507	834	7,673	94	PENNSYLVANIA
RHODE ISLAND	1,137	1,035	1,035	-	102	3	1,140	765	694	694	-	71	372	341	341	-	31	RHODE ISLAND
SOUTH CAROLINA	6,411	6,411	6,411	-	-	189	6,600	5,743	5,743	5,743	-	-	668	668	668	-	-	SOUTH CAROLINA
SOUTH DAKOTA	5,996	5,966	5,966	-	30	40	6,036	5,209	5,179	5,179	-	30	787	787	787	-	-	SOUTH DAKOTA
TENNESSEE	7,446	7,181	7,181	-	265	-	7,446	7,041	6,776	6,776	-	265	405	405	405	-	-	TENNESSEE
TEXAS	20,953	20,953	20,953	-	(4/)	584	21,537	15,835	15,835	15,835	-	-	5,118	5,118	5,118	-	-	TEXAS
UTAH	5,129	4,667	4,667	-	462	-	5,129	3,233	2,799	2,799	-	434	1,896	1,868	1,868	-	28	UTAH
VERMONT	1,765	1,765	1,765	-	-	102	1,867	1,747	1,747	1,747	-	-	18	18	18	-	-	VERMONT
VIRGINIA	46,320	46,320	9,225	37,095	-	218	46,538	27,194	27,194	8,231	18,963	-	19,126	19,126	994	18,132	-	VIRGINIA
WASHINGTON	3,783	3,528	3,528	-	255	-	3,783	3,564	3,329	3,329	-	235	199	199	199	-	-	WASHINGTON
WEST VIRGINIA	33,819	33,633	4,666	28,967	186	-	33,819	9,376	9,190	4,179	5,011	186	24,443	24,443	487	23,956	-	WEST VIRGINIA
WISCONSIN	10,012	9,888	9,888	-	124	366	10,378	9,952	9,829	9,829	-	123	60	59	59	-	1	WISCONSIN
WYOMING	3,599	3,567	3,567	-	32	62	3,661	3,100	3,071	3,071	-	29	499	496	496	-	3	WYOMING
TOTAL	533,144	517,664	340,160	177,504	15,480	3,657	536,801	389,551	374,587	289,103	85,484	14,964	143,593	143,077	51,057	92,020	516	TOTAL

1/ THIS TABLE GIVES THE EXISTING MILEAGE, ON DECEMBER 31, 1936, OF ROADS AND STREETS UNDER THE JURISDICTION OR CONTROL OF THE STATE HIGHWAY DEPARTMENTS, INCLUDING CITY STREETS DESIGNATED AS EXTENSIONS OF THE STATE HIGHWAY SYSTEMS. INCOMPLETE DATA ON CONNECTING STREETS NOT ON THE DESIGNATED STATE SYSTEMS ARE LISTED AS SUPPLEMENTARY INFORMATION IN COLUMN 6. FOR FURTHER DETAIL ON PRIMARY SYSTEMS SEE TABLE SM-2; ON SECONDARY ROADS UNDER STATE CONTROL, TABLE SM-3; AND ON URBAN EXTENSIONS, TABLE SM-4.

2/ IN THIS COLUMN ARE INCLUDED THE FOLLOWING: SECONDARY STATE HIGHWAYS IN COLORADO, LOUISIANA, MISSISSIPPI, MISSOURI, MONTANA, NEVADA, OREGON, AND PENNSYLVANIA; STATE-AID SYSTEM IN MAINE AND NEW HAMPSHIRE; COUNTY ROADS UNDER STATE CONTROL IN DELAWARE, NORTH CAROLINA, VIRGINIA (ALL BUT 3 COUNTIES), AND WEST VIRGINIA.

3/ CONNECTING STREETS IN CITIES OF LESS THAN 3,000 POPULATION ARE INCLUDED WITH RURAL STATE HIGHWAYS. CONNECTING STREETS IN LARGER CITIES ARE NOT INCLUDED IN THE SYSTEM AND THEIR MILEAGE WAS NOT REPORTED.

4/ URBAN EXTENSIONS OF STATE SYSTEM (730 MILES) INCLUDED WITH PRIMARY RURAL ROADS, AS THEY WERE REPORTED WITHOUT SEGREGATION BY TYPES.

distributed to the following types of work: 172 miles of grading involving 5,500,000 yards of material, $1,330,000; 245 miles of gravel or crushed stone surfacing requiring 1,900,000 tons of material, $1,050,000; 130 miles of oil treatment, $450,000; 0.2 miles of high type paving, $20,000; and 45 bridges, $650,000.

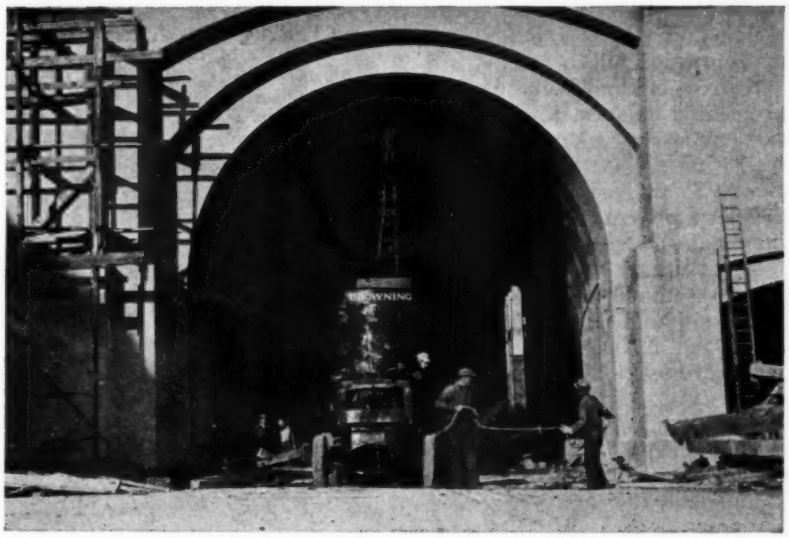
No highway funds were diverted in Montana in 1937.

Nebraska

A total of $10,691,000 will be available for Nebraska highways in 1938, according to estimates of the Department of Roads and Irrigation. This represents an increase of 9 per cent over the 1937 highway budget.

Sources of revenue will be Federal funds other than Hayden-Cartwright allotment, $3,600,000; state gas tax, $6,491,000; vehicle license fees and other state sources, $600,000.

Construction funds will be scheduled as follows: 500 miles of grading involving 12,500,000 yards of material, $2,298,000; 240 miles of gravel or crushed stone surfacing, $500,000; 260 miles of oil treatment, $1,500,000; 40 miles of high type paving, $1,250,000; 50 bridges amounting to $650,000; and 12 grade separation projects totalling $1,000,000. About 1,500,000 yards of previously awarded excavation amounting to $242,000 will be carried over into 1938.



● George M. Brewster of Bogota, New Jersey constructed the Jersey entrance to the South Tube of the Lincoln tunnel. This tube will be open to Mid-Town New York-New Jersey traffic soon, with completion of the North Tube to follow. The Mack truck-mounted Browning crane was used for excavating, work on retaining walls, and handling steel bent sections.

Nevada

The highway program in Nevada in 1938 will total $4,190,335, approximately equalling the 1937 budget.

The Hayden-Cartwright Act will supply $2,940,335 of this total; state gas tax, $1,150,000; and vehicle license fees and other, $250,000.

Construction work planned will amount to $2,940,335; maintenance, $800,000; and other work, $450,000. The division of construction funds has not been ascertained at this date.

No highway funds were diverted in 1937.

New Hampshire

Details of the New Hampshire 1938 highway budget are not completed at this early date, but the State Highway Department has been kind enough to formulate rough estimates especially for this highway forecast.

About $5,750,000, an increase of $100,000, is expected to be available. Construction will total $2,750,000 and maintenance an additional $3,000,000. Sources of these funds are the Hayden-Cartwright Act, $1,000,000; state gas tax, $2,350,000; and vehicle license fees and other state sources, $2,400,000.

Construction is planned as follows: 100 miles of gravel or crushed stone surfacing; 200 miles of oil treatment; 20 miles of high type paving; 37 miles of low type paving; and 35 bridges.

New Jersey

Anticipated revenue for the 1938 New Jersey highway budget totals $47,960,000, of which $42,485,690 will be administered by the State Highway Department. Final determination of these sums

Federal Vehicle Taxes as Road Expenditures

Fiscal Year	Federal-Aid Expenditures for Road Work 28/	Motor Vehicle Taxation by Federal Government 29/	Annual Net Motor Vehicle Contribution to Federal Government	Cumulative Net Motor Vehicle Contribution to Federal Government
1917	$ 34,338	—	$ —34,338	$ —34,338
1918	574,816	$ 25,414,593	24,839,777	24,805,439
1919	2,915,283	54,943,687	52,028,404	76,833,843
1920	20,340,774	154,389,441	134,048,667	210,882,510
1921	57,462,768	127,312,617	69,849,849	280,732,359
1922	89,946,604	113,843,199	23,896,595	304,628,954
1923	71,604,709	146,197,890	74,593,181	379,222,135
1924	80,447,823	160,028,549	79,580,726	458,802,861
1925	97,472,507	126,551,820	29,079,313	487,882,174
1926	89,362,110	139,801,992	50,439,882	538,322,056
1927	82,977,566	66,437,881	—16,539,685	521,782,371
1928	82,513,834	51,628,266	—30,885,568	490,896,803
1929	84,006,619	5,545,866	—78,460,753	412,436,050
1930	77,892,192	2,320,263	—75,571,929	336,864,121
1931	155,887,639	—	—155,887,639	180,976,482
1932	188,717,621	—	—188,717,621	—7,741,139
1933	165,868,106	181,434,958	15,566,852	7,825,713
1934	224,488,814	309,110,436	84,621,622	92,447,335
1935	277,788,551	277,827,108	38,557	92,485,892
1936	228,783,949	309,698,933	80,914,984	173,400,876
Totals	$2,079,086,623	$2,252,487,499	$173,400,876	

Total Federal Tax Collections to February 28, 1937 ..... $2,393,710,119
Total Expenditure Reg. and Emergency Fed. Aid, Feb. 28, 1937 2,344,072,268

Amount of income greater than expenditures ..... $ 49,637,851

Amount of Income Greater Than Expenditures—Sept. 30, 1937 ..... $107,000,000

will be made when the legislature meets and passes the necessary appropriation bill.

Sources of funds will be: Unappropriated balance, $500,000; gas tax, $22,250,000; motor vehicle fees, fines, etc., $19,800,000; Bonds, $3,421,000; bus excise tax, $90,000; Federal Aid $1,700,000; miscellaneous receipts, $200,000.

Construction on the State Highway System will be $17,357,898.80 and maintenance will require an additional $3,000,000. Other expenditures will be: principal and interest on highway bonds, $7,481,891.20; state aid for county and municipal highway work, $9,570,000; expenses of motor vehicle and fuel tax departments, $213,000; operation of bridges, $250,000; lighting and traffic signals, $875,000; purchases and plant equipment, $215,000; construction of institution roads and bridges, $500,000; and administration, right of way, etc., $2,100,000.

Allocations for non-highway purposes will probably be as follows: principal and interest on institution buildings, emergency relief and educational aid, $5,312,560; Board of Commerce and Navigation, $90,000; and Delaware River Joint Toll Bridge Commission, $72,750. This diversion totals $5,475,310.

New Mexico

Highway expenditures in New Mexico for the fiscal year will total about $13,586,000. This sum closely approximates the amount allotted to the State Highway Department last year.

Construction work will take $12,036,000 of the total; maintenance $1,400,000; and other work $150,000. Funds will be obtained from the following sources: Hayden-Cartwright Act, $2,040,685; other Federal funds, $840,428; state gas tax, $3,800,000; vehicle license fees and other, $1,450,000.

Division of construction funds has not been estimated at this early date. About 1,876,542 yards of previously awarded excavation amounting to $480,000, will be carried over into 1938.

There was no diversion of highway funds in New Mexico in 1937.

SUMMARY of DATA on HIGHWAY, ROAD and STREET PROJECTS of the WORKS PROGRESS ADMINISTRATION

68,300 Projects Completed, in Operation, or Approved for Operation, as of November 20, 1937.

16,947 Projects Completed, as of March 31, 1937, at cost of $196,868,144.00, of which 78.1 per cent was contributed by the Federal government and 21.9 per cent was supplied by sponsors. Of the total expended on these completed projects, 68.1 was for labor costs and 31.9 for other costs, including materials, supervision, engineering, etc.

Value of Materials, Supplies, and Equipment Purchased for WPA Highway, Road and Street Projects, by Sources of Funds, Cumulative through September 30, 1937:

Total	$163,133,735.00
Federal	87,845,451.00
Sponsors	75,288,284.00

Value of Rentals and Services Supplied to WPA Highway, Road and Street Projects, by Sources of Funds, Cumulative through September 30, 1937:

Total	$192,692,074.00
Federal	100,550,012.00
Sponsors	92,142,062.00

Value of Rentals of Paving, Road Building, and Construction Equipment (See Footnote No. 1) Supplied to WPA Projects, Cumulative through September 30, 1937, by Sources of Funds:

Total	$ 93,421,423.00
Federal	34,348,164.00
Sponsors	59,073,259.00

Footnote No. 1—Rentals of Paving, Road Building, and Construction Equipment Totals include Expenditures for Such Equipment Rentals Supplied to Construction Projects other than Highways, Roads and Streets.

● Excavation for the New York World's Fair has required a variety of interesting equipment. Illustrated here is an Elmhurst Contracting Company Lorain 40 equipped with a 15-cubic-foot Hayward Orange peel bucket.

New York

C. C. Ahles, Principal Highway Engineer, reports that New York's state legislature does not meet until January 2, and that they seldom appropriate highway funds before March 1.

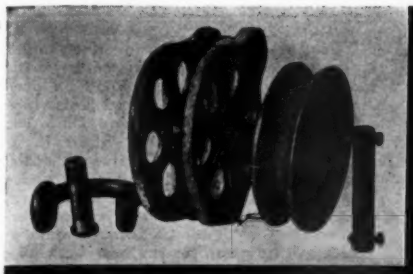
New York's allotment of Federal funds is expected to be: Regular Federal Aid, $6,250,000; Farm-to-Market roads, $1,250,000; and Grade Crossing Elimination, $3,500,000.

The state constitution requires that all highway income go into the State Treasury and be appropriated out by the legislature. Highway department funds, therefore, are directly dependent on legislative action.

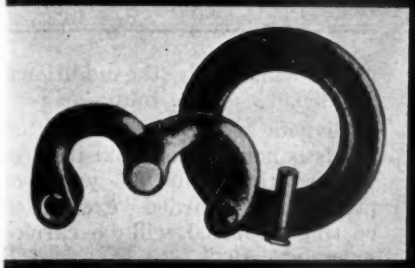
Mr. Ahles informs us that there is practically no balance of highway funds unobligated on January 1.

The 1937 state highway construction funds in New York totaled $33,381,507; with $12,231,796 of this coming from regular Federal Aid, $4,155,000 from Works Program funds, and $18,994,711 from State revenues. 1937 state highway maintenance funds were $11,014,093, giving a total state program of $44,395,600.

An estimated 80 miles of improved earth roads, 170 miles of



FREE RUNNING, OIL POCKET, DUMP SHEAVE

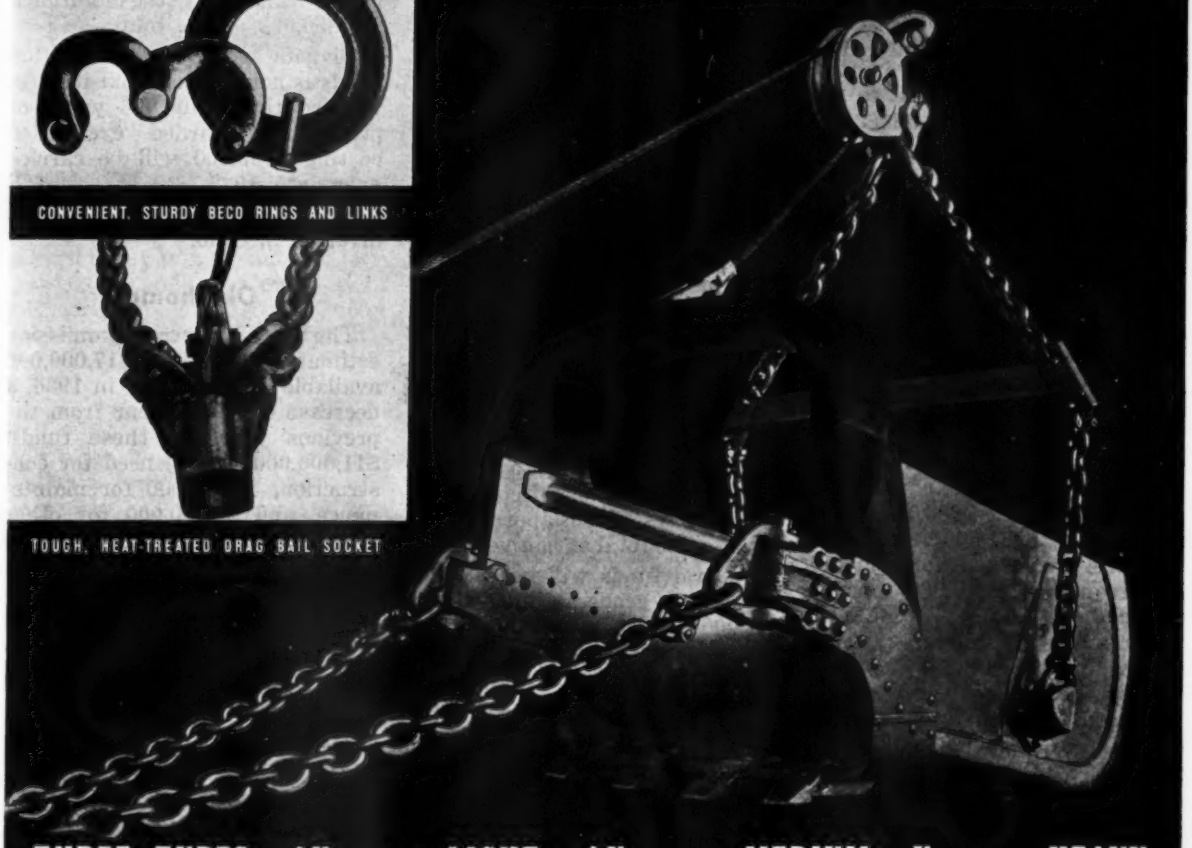


CONVENIENT, STURDY BECO RINGS AND LINKS

TOUGH, HEAT-TREATED DRAG BAIL SOCKET

BUCYRUS-ERIE

RED ARCH DRAGLINE BUCKETS FOR BIG OUTPUT



THREE TYPES: AU . . . LIGHT; AX . . . MEDIUM; Y . . . HEAVY

RUNNER BARS FOR LONGER LIFE

LONG-WEARING HOIST TRUNNION

FLEXIBLE DRAG CHAIN HITCH

BUCYRUS ERIE

EXCAVATING, DRILLING AND MATERIAL HANDLING EQUIPMENT

SOUTH MILWAUKEE, WISCONSIN

For your convenience in writing to Bucyrus-Erie Co., you will find a card bound in this issue.

treated gravel roads, 250 miles of bituminous macadam roads, and 210 miles of concrete roads were constructed in 1937.

North Dakota

North Dakota will spend approximately $6,924,904 on its highways in 1938. This total gives the state a road program equal to that carried on in 1937.

Construction will total $4,683,904; maintenance, $1,254,000; and other work, $987,000. In addition to the amount shown for construction, North Dakota will have available $1,296,000 in regular Federal Aid funds to be matched by the state and $200,000 in Federal funds for secondary roads to be matched by counties. This would give a construction total of $7,675,904, but it is probable that the money will not be matched.

Sources of funds are: Hayden-Cartwright Act, $3,715,286.44; Federal Land funds, $68,617.56; county funds, $200,000; state gas tax, $1,794,010; and vehicle license fees and other, $1,146,990.

Construction funds will be divided as follows: 231 miles of grading involving 4,686,100 yards of material, $931,600; 318 miles of gravel or crushed stone surfacing, requiring 1,306,980 tons of material, $1,126,870; 48 miles of oil treatment requiring 502,650 gallons of material, $59,350; 54 miles of shouldering involving 54,000 yards of material, $48,900; 417 miles of low type paving, $1,947,000; 9 miles of landscaping, $39,184; and 6 bridges (includes 3 or 4 grade separation structures), $531,000.

About 87,000 yards of previously awarded excavation amounting to $20,000 and grade separation work totalling $337,000 will be carried over into 1938. No highway funds were diverted in North Dakota in 1937.

North Carolina

A highway program amounting to $23,600,000 will be carried on in North Carolina in 1938 according to preliminary estimates. Construction will require $11,300,000 and maintenance an additional $12,300,000.

The Hayden-Cartwright Act will provide 28.8 per cent of this total and state gas tax and vehicle license fees and other sources will provide 71.2 per cent.

Construction funds will be divided as follows: 200 miles of grading, $1,200,000; 275 miles of gravel or crushed stone surfacing, $1,550,000; 325 miles of oil treatment, $1,300,000; 100 miles of high type paving, $2,600,000; 50 miles of low type paving, $650,000; and bridges totalling $4,000,000.

In the fiscal year from July 1, 1936 to June 30, 1937, about $1,006,000 was diverted in North Carolina.

Ohio

Funds available for highway work in Ohio during 1938 will total $24,484,000, according to information released by the Department of Highways. This is approximately the same total as last year.

Federal funds will be obtained as follows: grade separation, $2,141,000; Regular Federal Aid, $4,565,000; Federal Aid Secondary, $928,000. The state gas tax, vehicle license fees and other state funds will supply the additional $16,850,000 of the total.

Division of 1938 construction funds is not complete but it is estimated that 1,400,000 yards of previously awarded excavation costing $700,000 will be carried over into 1938.

In 1937 no highway funds were diverted in Ohio.

Oklahoma

The State Highway Commission estimates a total of $17,000,000 available for highways in 1938, a decrease of 26 per cent from the previous year. Of these funds, $11,000,000 will be used for construction, $4,000,000 for maintenance, and $2,000,000 for other purposes.

A total of $4,750,919 in Federal funds is anticipated, with State gas tax furnishing $9,900,000, and vehicle license fees, etc., $2,900,000.

The 1938 program includes

"Good roads and what they mean to us" is the subject of a poster contest being sponsored by the American Road Builders' Association, for the senior and junior high school art students of Cleveland, Ohio. The association has contributed $500 to be awarded for the posters that best depict various phases of good road construction and its value to the American highway user. A grand prize of a one-year scholarship at the Cleveland Art School, valued at $300, will be given for the best work by a student in the senior high schools. Forty-four other prizes totalling $200 will also be distributed.

● Eliminating Main St. crossing in Akron, Ohio. Contractor, Bates & Rogers Construction Co. of Chicago. The Davey 315-foot side-by-side compressor is shown here furnishing air for pile driving. This unit has engine and compressor mounted in parallel, reducing wheelbase to 127" and increasing portability. Air from it was piped all over this job for a variety of uses.

● For gravel loading, mobile, speedy ⅜-yard shovels have proved invaluable. Owned by R. Truitt of Berwyn, Maryland, this rig is shown loading gravel for state road construction from a pit owned by Smith Sand Company.

247.8 miles of grading, 198.6 miles of high type paving, 5 miles of low type paving, and 4 major bridges.

Excavation costing $750,000, and awarded in 1937, will be carried over into 1938.

Oregon

A total of $14,600,000 will be available for highway work in Oregon in 1938. This sum represents a decrease of 20 per cent from highway expenditures in 1937.

According to plans of the State Highway Commission, $6,000,000 will be used in construction; $3,600,000 for maintenance; and $5,000,000 for other purposes, such as Bonds, Right-of-Way and Surveys.

Federal funds will be the source of $4,000,000 of the total, with $2,900,000 being provided through the Hayden-Cartwright Act. State gas tax will provide $10,000,000 and vehicle license fees and other, $600,000. Of the net sum to the Highway Commission $2,150,000 will be used for road purposes by counties and $350,000 will be used by State Police.

Preliminary layout of the work indicates the following division of construction funds: 130 miles of grading involving 5,000,000 yards, at a cost of $2,800,000; 140 miles of gravel or crushed stone surfacing requiring 750,000 tons of material, $1,000,000; 150 miles of oil treatment, $400,000; 20 miles of high type paving, $600,000; 10 miles of low type paving, $100,000; and 25 bridges totalling $1,100,000. These figures include carry-over work.

In 1937 Oregon had no diversion of highway funds.

Pennsylvania

S. W. Marshall, chief engineer of the Pennsylvania State Highway Department reports a total of $121,100,000 available for highway use during the 1937-38 fiscal year. Figures for the fiscal year beginning June 1, 1938 will not be available until early Spring. The 1937-38 total is an increase of 10 per cent over the previous year.

Funds available come from: Federal Aid $33,100,000 (including secondary roads and grade crossing elimination funds); and state gas tax and vehicle license fees, $88,000,000.

There was no diversion of highway funds in Pennsylvania for the fiscal year 1936-37, it is reported.

1937-38 construction funds are divided for use as follows: 26.6 miles of grading, costing $182,908.11; oil treatment costing $5,651,300; 357.05 miles of high type paving, costing $52,358,587; and 549.76 miles of low type paving costing $2,173,742. 681 bridges are on the program, at a cost of $5,316,371.

Automotive taxes hit a new high of $1,550,000,000 in 1937, or nearly $125,000,000 more than in 1936, it is estimated by the American Petroelum Industries Committee. Less than $1,000,000,000 of that money, however, will find its way to road funds. The bulk of these payments, $1,145,000,000, will go to state governments in the form of gasoline taxes and registration fees. The federal government will receive as its share approximately $330,000,000, of which nearly two-thirds will be derived from the duplicating federal tax on gasoline.

As the motorists of the United States, a majority of whom earn from $20 to $30 a week, hand over almost $1,000,000,000 in gasoline taxes this year to the federal and state governments, they will pay a sum of money equivalent to nearly 7 per cent of the total wages of all the industrial workers in manufacturing plants in the United States.

Rhode Island

Available funds for highway work in Rhode Island amount to $2,879,000, approximately the same total as 1937 expenditures.

Sources of income are: Hayden-Cartwright Act, $735,000; state gas tax, $1,835,000; vehicle license fees and other, $309,800. Division of the budget is as follows: construction, $1,470,000; maintenance, $1,100,000; other work, $309,800.

Allocation of construction funds will be: 17 miles of grading involving 180,000 yards of material, $70,000; 2.5 miles of gravel or crushed stone surfacing requiring 7,000 tons of material, $30,000; 14.5 miles of high type surfacing requiring 800,000 square yards of material, $1,200,000; and one underpass, $200,000. In addition 3,000,000 square yards of surface will be oil treated as maintenance work, at a cost of $350,000.

Approximately $2,000,000 in highway funds were diverted for non-highway purposes in Rhode Island in 1937.

South Carolina

Construction

Highway construction activities of the South Carolina State Highway Department were carried on at a relatively rapid rate in 1937 and the indications are that the work in 1938 will exceed that of

● A sand asphalt base stabilization job in South Carolina is illustrated here. Contractor is C. G. Fuller; equipment is a Model 179-2 Jaeger Roadbuilder. The stabilized layer is 5" compacted thickness, 22 feet wide. Job was handled in two lanes. Between 2000 and 2500 feet of road was mixed each 10 to 12 hours.

1937, according to J. B. Williamson, State Highway Engineer.

In 1937, 115 construction contracts were awarded for work estimated to cost $9,933,958.25. The mileage and type of the projects included in these contracts were as follows:

Grading	45.022 miles
Bituminous Surfacing	405.510 miles
Cement Concrete	28.098 miles
Widening	37.424 miles
Bridges—46 Contracts	

(Note: These figures include estimates for projects advertised to be let in December.)

Work on 126 of the contracts let or to be let in 1937, or before, will not be complete by January 1st. The uncompleted portions of these contracts represent approximately $7,000,000.00 to be paid to contractors and others in 1938 on account of the work.

New construction programmed for the two year period ending June 30, 1939, and which has not yet been let to contract includes road and bridge projects estimated to cost approximately $12,000,000.00. Substantially all of these projects will be let to contract by December 31, 1938.

Maintenance

Maintenance expenditures for the fiscal year ending June 30, 1937, were as follows:

Direct Cost of Maintenance, including labor, material and supplies	$1,340,532.07
Supervision	66,835.75
Retreatments	747,107.60
Special Maintenance Work	94,330.71
Purchase of New Equipment	373,373.49
Total	$2,622,183.62

The maintenance estimate for the fiscal year July 1, 1937, through June 30, 1938, is as follows:

Maintenance, including general supervision	$1,400,000.00
Shoulder treatment	200,000.00
Purchase of New Equipment	300,000.00
	$1,900,000.00

The estimate for retreatment work for 1938 will not be prepared until spring of 1938.

Motor Vehicle License Fees and Gasoline Tax

Revenue of the South Carolina State Highway Department from the Motor Vehicle License Fees and Gasoline Tax for the fiscal year ending June 30, 1937, was as follows:

Gasoline Tax	$8,675,247.13
M. V. Lic. Fees	1,091,698.01
Total	$9,766,945.14

South Dakota

According to figures recently released by Assistant Engineer Thor Soleglad, State Highway Commission, South Dakota will spend approximately $7,135,000 on its highways during the next twelve months. This is about equal to 1937 expenditures.

Funds will be obtained from the following sources: Hayden-Cartwright Act, $2,530,000; other Federal funds, $360,000; state gas tax, $3,445,000; vehicle license fees and other state sources, $800,000.

Construction funds will be used for 300 miles of grading involving 11,500,000 yards of material, at a cost of $1,500,000; 100 miles of gravel or crushed stone surfacing requiring 200,000 tons of material, at a cost of $150,000; 300 miles of oil treatment, $2,735,000; 10 miles of high type paving, $300,000; and 40 bridges at a cost of $500,000.

The total estimated cost of work carried over into 1938 is $865,000.

Because of wide variation in the use of automotive tax funds, the motorists' tax dollar in one state may currently buy two or three times as much road improvement as a tax dollar paid in another state according to the American Petroleum Institute. Chief among the causes for this fluctuation of the value of the motorists' tax dollar are: 1. Misuse of road taxes for non-highway purposes. 2. Excessive debts. 3. Unwise division of road funds with local units of government.

Diversion of automotive taxes to purposes other than highway financing takes a sizable slice from the motorists' tax dollar in more than half of the states. Only in a few states is there no diversion. The highest misuse of automotive tax funds is in New York, where 58.2c of the automotive tax dollar last year was used for non-highway purposes.

Tennessee

Detailed figures for Tennessee's highway program in 1938 and 1937 work are not available at this time. Estimated construction total for 1937 was $9,756,000, of which a large part came from Federal Aid, the 1935 Works Relief Bill and NIRA. Practically no funds from the latter two will be available in 1938.

Tennessee's Hayden-Cartwright allotments for 1937 were: Regular Federal Aid, $2,681,110; secondary roads, $536,222; grade crossing elimination $958,753.

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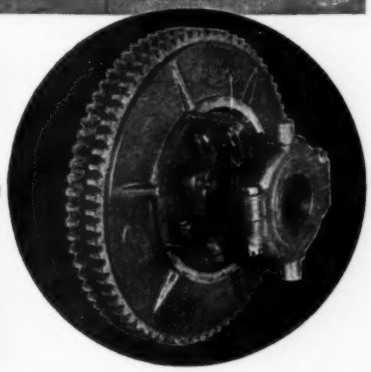

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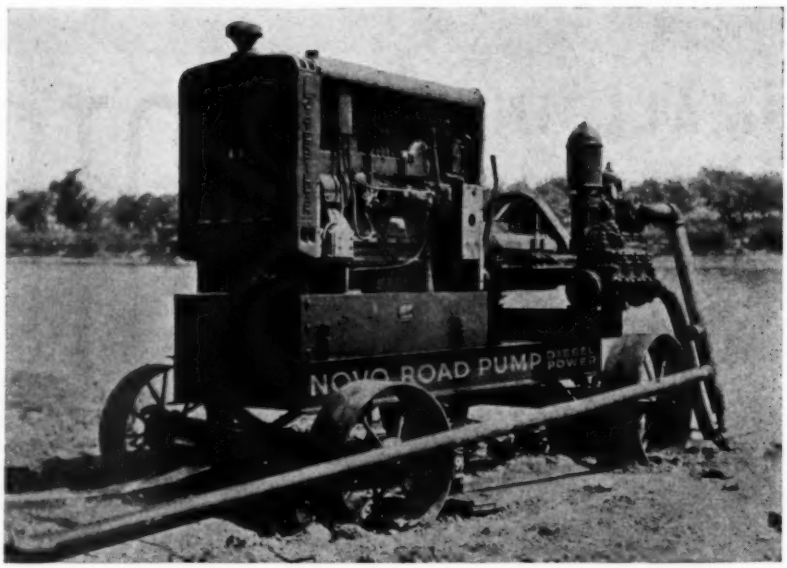

● Water for paver and for curing on Briggs Killian Company's paving job between Corpus Christi and Calallen, Texas was furnished by this Novo unit. Discharging over a mile-long, 2½" pipe, the unit pumped 110 to 120 gallons per minute at 375 to 400 pounds pressure.

Texas

Texas has available in the present fiscal year, ending August 31, 1938, the following Federal programs: Regular Federal Aid, $15,915,220; secondary program, $3,183,044; grade crossing program, $2,539,872. The State Highway Commission has appropriated $6,993,376 for regular maintenance of the highway system, and in addition, $773,236 for special work such as elimination of traffic hazards and traffic services.

The submission of the 1938 regular Federal program as a whole to the Bureau of Public Roads provided for the surfacing of 90 per cent of the Texas Federal Aid system, which entitled the state to apply for an increase of 1 per cent. Application was made and approved; on November 5, 1937, the Commission authorized the State Highway Engineer to request that various sections of highways, totalling 1,194 miles, be added to the Federal Aid System.

Active construction on September 1, 1937, beginning of the current fiscal year, amounted to the following: landscape projects, $148,814; 458 miles of grading and small drainage structures, $4,673,015; 278 miles of gravel and cliche surface, $1,748,153; 418 miles of asphalt surface, $4,029,341; 200 miles of concrete and brick, $4,998,972; highway protecting devices, $399,403; highway planning survey, $1,269,137; 44 large bridges, $8,851,692; and 15 grade projects, $1,786,708.

Construction contracts let in the fiscal year ending August 31, 1937, amounted to $24,206,941. These contracts covered the following types of work: landscaping, $133,140; grading and small drainage structures, $5,307,358; gravel and cliche surface, $2,065,543; asphalt surface, $5,777,383; concrete and brick, $6,799,831; highway protecting devices, $388,736; large bridges, $3,132,230; grade separations, $602,720. Construction work completed in the same period amounted to $29,976,770.

Utah

A 4 per cent increase in highway funds for Utah in 1938 is reported by W. L. Anderson, Chief Draftsman. This gives the state a total of $6,000,000 to be divided as follows: construction, $3,900,000; maintenance, $1,500,000; other work, $600,000.

Sources from which this money will be made available are: carryover of Federal funds, $400,000; Hayden-Cartwright Act, $2,000,000; other Federal funds, $700,000; state gas tax, $2,900,000.

Preliminary plans indicate the following division of construction funds: 60 miles of grading involving 2,000,000 yards of material, $600,000; 80 miles of gravel or crushed stone surfacing requiring 1,100,000 tons of material, $610,000; 130 miles of oil treatment, $720,000; 18 miles of high-type paving, $540,000; 20 miles of low type paving, $375,000; and 26 bridges, $1,055,000. About 300,000 yards of previously awarded excavation amounting to $150,000 will be carried over into 1938.

No highway funds were diverted in Utah in 1937.

Vermont

Approximately the same size program as in 1937 is anticipated by the Vermont Highway Department, assuming the regular Federal Aid appropriation stands.

Construction total for the coming year will be $625,000, derived from Federal Aid, and $750,000 derived from State funds. Maintenance for 1938 is expected to total $990,000, which is the amount of revenue anticipated from State gas tax and vehicle license fees.

Total estimated mileage to be graded under the proposed program is 29, requiring 700,000 yards of excavation. Surfacing scheduled includes 7 miles of grading, 1 mile of high type paving, 21 miles of mixed-in-place surfacing. 6 bridges are planned for construction in 1938.

About 100,000 yards of previously awarded highway excavation will be carried over into 1938.

Virginia

Reporting highway funds available for the fiscal year ending June 30, 1938, Auditor C. J. Allard places the total at $24,835,699, a decrease of about $630,000, or 2½ per cent, from the previous year.

These funds are derived from: Federal Aid, $3,735,699; State gas tax, $15,164,000; Vehicle license fees and other sources, $5,936,000.

Use of the funds is divided as follows: Construction — primary system, $10,588,912.13; Maintenance—primary system, $3,078,700.00; Improvements—primary system, $2,052,000. Improvements and construction on secondary roads totals $3,926,809, and secondary road maintenance comes

● Burch Construction Company has the contract for this section of route 61 between Lancaster and Potosi, Wisconsin. An Ingersoll-Rand 2-stage portable compressor operates an FM wagon drill and jackhammers.

to $2,712,600. City streets work scheduled costs $700,000. $1,776,677.87 goes to Motor Vehicle department, interest on Certificates of Indebtedness, to provide Sinking Fund, etc.

There was no diversion of highway funds in 1937. Detailed figures showing use of 1938 construction funds are not available at this time.

Washington

Director of Highways L. V. Murrow reports that Washington will have about $10,753,000 available for highways in 1938. This is an increase of about 3 per cent.

Construction for 1938 will require $6,724,000; maintenance $3,370,000; and other expenses $659,000. Washington's share of Federal Aid is estimated at $2,002,877; Grade Crossing program $767,991; and Federal Aid Secondary road allocation, $400,575. State gas tax and vehicle license fees are expected to provide $7,581,557.

In 1937, $1,000,000 was diverted from highway revenues for interest and redemption of relief bonds.

Construction funds will be divided approximately as follows during the coming year: Grading and surfacing, 49 per cent; Bridges, 18 per cent; Bituminous Surfaces, 7 per cent; Paving, high type, 20 per cent; miscellaneous 6 per cent.

In addition to the above, about $3,000,000 of previously awarded highway excavation will be carried over into 1938.

West Virginia

The West Virginia Road Commission wires that the 1938 construction program is expected to be approximately $6,000,000. Detailed figures or estimates as to how this money will be divided for use are not available at present.

In 1937, West Virginia's share of Federal funds was $2,340,248. Of this, $1,390,447 was in Regular Federal Aid; $278,089 for secondary roads; and $671,712 for grade crossing elimination. If authorized 1939 funds stand, approximately the same amounts should be available for 1938 use.

Wisconsin

Wisconsin will have $20,600,000 available for its 1938 highway budget, an increase of 4.5 per cent over 1937, according to information from the State Highway Commission.

Construction will total $14,600,000 and maintenance $6,000,000. Sources of these sums will be: Hayden-Cartwright Act, $3,100,000; other Federal funds, $1,870,000; state gas tax, vehicle license fees and other, $12,300,000; and county and local funds, $3,030,000.

Division of construction funds will be as follows: 315 miles of grading, $6,285,000; 250 miles of gravel or crushed stone surfacing, $960,000; 285 miles of oil treatment, $712,000; 100 miles of high type paving, $3,157,000; miscellaneous, $188,000; and bridges totalling $3,350,000. About 750,000 yards of previously awarded excavation will be carried over from last year.

No highway funds were diverted in Wisconsin in 1937.

Building with an eye to future traffic needs, Wisconsin plans to start next summer a 22-mile, $1,400,000 super-highway between Pewaukee and Oconomowoc. Two 20-foot lanes separated by a 300-foot parkway, and a 150-foot right of way with no curves greater than five degrees comprises the plan.

Wyoming

A total of approximately $5,900,000 will be available for highway use in 1938, according to C. F. Seifried, Highway Department Superintendent. This figure is predicated on receipt of funds as provided under the Hayden-Cartwright bill, and is an increase of 2½ per cent over last year's funds.

About $5,000,000 will be available for construction, $800,000 for maintenance, and $100,000 for other uses. 1939 Hayden-Cartwright funds, and balance of 1937 and 1938 allotments make up $3,220,000 of the available funds, and other Federal sources provide $72,000. State gas tax revenues are estimated at $1,700,000, and vehicle license fees and other sources at $908,000.

1938 construction funds will be divided for use as follows: 170 miles of grading, costing $650,000 and requiring 3,500,000 yards of excavation; 170 miles of gravel and crushed stone surfacing at a cost of $270,000, requiring 400,000 tons of material. Three types of oil treatment will be given 200 miles of road. The first, costing $200,000, requires 260,000 tons of material. The second, costing $350,000, will take 4,500,000 gallons of MC oil. The third, costing $150,000, will take 1,000,000 gallons of RC oil.

40 bridges at a cost of $300,000 are on the 1938 program. Previously awarded excavation carried over into 1938 will total 2,250,000 yards, will cost $400,000.

Book reviews

"America Spreads Her Wings," an insight into the magnitude of airport development under the Federal Works Program, is the name of a recently published illustrated bulletin by the Works Progress Administration, Washington, D. C.

A 16-page, illustrated descriptive booklet on roller gate concrete buckets, has been issued by the **Blaw-Knox Company**, Pittsburgh, Pennsylvania. Known as Catalog 1586, the 8½"x11" pamphlet contains details and illustrations of the various kinds of roller gate buckets including cableway operating types, underwater types, and special designs for unusual requirements. A complete list of specifications and sizes is included. A copy will be sent upon request of interested parties.

The Universal Crusher Company, Cedar Rapids, Iowa, has just issued Bulletin No. 100 covering their line of Bronze Bearing Jaw Crushers; Bulletin No. 200 covering their line of Roller Bearing Jaw Crushers; Bulletin No. 300 covering Universal Roll Crushers; and Folder No. 19 covering Universal 30-Q Portable Plants.

Each Bulletin gives complete construction details, dimensions, specifications and other data and may be obtained by addressing the Universal Crusher Company.

The Mine Safety Appliances Company, Braddock, Thomas and Meade Streets, Pittsburgh, Pennsylvania, has recently issued a booklet entitled **"Pertinent Questions and Answers Concerning Dusts."**

In view of the widespread interest in the harmful effects of breathing dusts, especially those containing free silica (producing silicosis), and because of the added stimulation created by Federal Agencies and state work in industrial hygiene, this booklet endeavors to answer some of the important questions that arise continually regarding the nature and effects of dusts, in simple and insofar as possible, non-technical language.

A 24-page catalog entitled **"Sullivan Plus Portable Compressors"** has just been published. Well illustrated, it describes the complete line of two stage portable air compressors manufactured by the Sullivan Machinery Company and contains specifications and data of value to those concerned with application of air compressors and air tools to construction and maintenance work. Copies may be had on application to the company's agents or representatives, or to the factory directly at Woodland Avenue, Michigan City, Indiana.

The Manhattan Rubber Mfg. Division of **Raybestos-Manhattan, Inc.**, Passaic, New Jersey, has issued a new illustrated four-page bulletin on their Condor Compensating Belts. In addition to describing the reason for compensating rubber belts and the Compensated Principle, the folder explains in detail engineering data essential to the proper selection, application and supervision of belts.

A new booklet **"Preventing Welding and Cutting Fires,"** just published, should be useful to all those interested in welding or cutting operations.

The booklet includes safe and sure rules to follow for preventing the possibility of welding or cutting fires, as well as other pertinent information.

Copies may be obtained free upon request to any office of The Linde Air Products Company, New York and principal cities.

The hoist and body division of **Gar Wood Industries, Inc.**, has recently released two, illustrated, six-page bulletins, describing Gar Wood heavy-duty cam and roller hoists and Gar Wood heavy-duty dump bodies. Copies of these new bulletins may be obtained by motor truck distributors, dealers

(Continued on page 76)

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Book Reviews

(Continued from page 74)

and their salesmen as well as users and operators, without obligation, by writing direct to the hoist and body division of Gar Wood Industries, Inc., Detroit, Michigan.

"Around The World With CLETRAC Crawler Tractors" shows CLETRACS in hundreds of operations in the United States and other parts of the world.

This book is highly pictorial, and will be sent upon request without cost or obligation. Ask for form No. 822.

"The Haynes Stellite Library," a booklet just published by Haynes Stellite Company, Kokomo, Indiana, lists and briefly describes eighteen Haynes Stellite books, reprints, and folders dealing with hard-facing alloys, cutting tools, and alloys for chemical processing equipment. This literature is summarized and grouped under four sections: "For the Machinist," "For General Maintenance," "For the Welder," and "For the Metallurgist." It may be had free upon request.

If you will ask **Caterpillar Tractor Co.**, Peoria, Illinois, for State Highway book form No. 4379 they will be glad to send it to you. This bulletin deals with the adoption of Diesel power by State Highway Departments and contains numerous illustrations of Caterpillar equipment on the job.

Trade notes

The Homestead Valve Manufacturing Co., Inc., Coraopolis, Pennsylvania, announces the appointment of: Dyke Motor Supply Co., 800 Webster Ave., Pittsburgh, Pennsylvania; Cole Brothers, 110 Thirteenth Ave., Nashville, Tennessee; City Auto Parts, 17 Church Street, Worcester, Massachusetts; and Automotive Supply Co., Inc., 116 W. Harris Street, Appleton, Wisconsin, as Distributors of The Hypressure JENNY.

Mr. G. D. Finney, who has been associated with the Rome Grader and Machinery Corporation for a number of years as Sales Manager, has accepted the position of Sales Manager for the **W. A. Riddell Corporation**, Road Machinery Department, entering his new duties on August 15th.

The Lincoln Electric Company, manufacturers of arc welding equipment, Cleveland, Ohio, announces the opening of a new sales office in Phoenix, Arizona, which will be in charge of R. J. Reardon.

Western Steel & Equipment Corp., 734 N. E. 55th Street, Portland, Oregon, has been appointed as District Representative for the entire line of **Ransome Concrete Machinery Co.**, in the Oregon territory.

FOR SALE

RATES

60c per line—minimum charge $2.40. Repeat insertions with no change in copy—three insertions for the price of two.
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Address all box numbers c/o EXCAVATING engineer . . . . . at South Milwaukee, Wisconsin

SMALL SHOVELS
Under 2 Yards

BUCYRUS-ERIE. 10-B gas shovel. 14" cat. treads. Hercules engine. Practically new. Located Texas. Box 2024-SS.

BUCYRUS-ERIE. 10-B gas shovel 14" treads. Electric starter. Hercules engine. Practically new. Located Mississippi. Box 2025-SS.

BUCYRUS-ERIE 10-B gas shovel. 14" treads. Hercules engine. 1 year old. Located Texas. Box 2026-SS.

BUCYRUS-ERIE — 10-B Gas shovel. Without starter. Excellent condition. Box 1147-SS.

BUCYRUS-ERIE—10-B factory rebuilt. New machine guarantee. Gasoline shovel, clamshell, dragline or drag shovel. Front-end equipment brand new. 14" Cat. treads. Electric starter. Located Western Pennsylvania. Box 1197-SS.

BUCYRUS-ERIE 10-B GAS—combination shovel, drag shovel and clamshell. 14" Cat. treads. Hercules 6-cyl. engine. Good condition. Favorable price. Located Central N. Y. State. Box 2000-SS.

INSLEY — TYPE C — GASOLINE SHOVEL. Engine recently rebored and reconditioned. Machine generally in good operating and mechanical condition. Equipped with Buda type KTU engine. Located Arkansas. Box 814-SS.

½-YARD

BROWNING—½-YARD GASOLINE SHOVEL and clamshell. Clamshell boom 30' plus 10' extension. Clamshell bucket included. Good condition. Located Maine. Box 1115-SS.

BUCYRUS-ERIE — TYPE A, ½-yard steam shovel. Cat mounted. 26' boom clamshell equipment. Located Central Illinois. Box 2007-SS.

BUCYRUS-ERIE 16-B GAS SHOVEL. 16'6" boom—12'6" dipper handle—½ cubic yard cast front inserted tooth dipper. Waukesha 6 cylinder 3¾"x4¾" gasoline engine. Excellent condition. Will demonstrate. Located western New York State. Box 930-SS.

BUCYRUS-ERIE 16-B gasoline shovel. Waukesha 6MS—6-cylinder 3¾"x4¾" engine. Electric starter. Good operating and mechanical condition. Located Wisconsin. Box 1198-SS.

GENERAL—GASOLINE ½-yard shovel and 35' boom clamshell. Located Central Illinois. Box 1187-SS.

P & H—MODEL 300—½-yard gasoline shovel. Reconditioned. Located Kentucky. Box 1107-SS.

⅝-YARD

BUCYRUS-ERIE Type A steam shovel. 16' boom. 12'-6" dipper handle. ⅝ yard shallow cut dipper. Two speed propelling mechanism. Hand operated boom hoist. Located vicinity New York. Box 958-SS.

BUCYRUS-ERIE TRAILER, suitable for 17-B or 19-B machine. Practically new. Located Boston. Box 1116-SS

¾-YARD

AMERICAN STEAM SHOVEL. Oil burning. Caterpillar mounted. Main machinery and boiler very good. Balance of machinery needs some repairs. Located Arkansas. Box 965-SS.

BUCYRUS-ERIE — TYPE B, ¾-yard steam shovel and 40' boom clamshell. Cat. mounted. Located Buffalo, New York. Box 2005-SS.

BUCYRUS-ERIE TYPE B high lift steam shovel. 19'6" shovel boom. 16' dipper handle. ¾ yard dipper. Also 42' boom clamshell equipment. Located Virginia. Box 961-SS.

BUCYRUS-ERIE TYPE B steam shovel. High lift. Boiler reported good condition and machinery generally in fair condition. Located Rockford, Illinois. Box 963-SS.

BUCYRUS-ERIE TYPE B STEAM combination Shovel-clamshell and steam hoe. Machine completely rebuilt 1929. Good operating condition. Located near Boston. Box 517-SS.

BUCYRUS-ERIE (2) TYPE "B" HIGH LIFT Caterpillar mounted Steam Shovels. Good operating condition. Located Eastern Pennsylvania. Box 1014-SS.

BUCYRUS-ERIE TYPE B Steam shovel, caterpillar mounted. Located Indiana. Box 983-SS.

BUCYRUS-ERIE TYPE B STANDARD ¾ YARD STEAM SHOVEL—Quarry type Dipper — Caterpillar mounted. Good operating condition. Located Georgia. Box 752-SS.

BUCYRUS-ERIE 1030 gasoline shovel and clamshell. 23' shovel boom. 15' dipper handle ¾ yard dipper. 35' clamshell boom and Owen "M" Model 230 clamshell bucket. Wisconsin B-3 gasoline engine. Cylinder blocks recently rebored. Machine in fair condition. Located Massachusetts. Box 982-SS.

BUCYRUS-ERIE—Type B Steam Shovel and Clamshell. 19'9" Shovel Boom—16' Dipper Handle—¾-yard Dipper. 40' Clamshell Boom. Also Ford Truck with 500-gallon steel water tank and pump. Reported to be in good operating condition. Located New Hampshire. Box 1164-SS.

BUCYRUS-ERIE TYPE B high lift steam shovel. Excellent operating condition. Located Seattle, Washington. Box 943-SS.

FOR SALE

Address all box numbers c/o EXCAVATING engineer . . . . . at South Milwaukee, Wisconsin

BUCYRUS-ERIE—TYPE B ¾ YD. Caterpillar mounted Extra high-lift steam shovel. Located Chicago. Good working order. Will rent or sell. Box 1100-SS.

BUCYRUS-ERIE TYPE B steam ¾-yard shovel and 36' boom clamshell including ¾-yard Williams clamshell bucket. Located Central New York. Box 1188-SS.

NORTHWEST—MODEL 105, ¾ yard gasoline shovel. Climax 4 cylinder 5½"x7" gasoline engine. Good operating condition. Located Eastern Pa. Box 1015-SS.

OSGOOD MODEL 18 STEAM—¾ yard shovel—Cat mounted. Just completely overhauled. Excellent condition. Located near Indianapolis, Ind. Box 522-SS.

OSGOOD — GASOLINE — COMBINATION shovel, clamshell, and dragline equipped with electric starter. Shovel Boom 9'6"—Dipper Handle 14'—Dipper 1 yard standard and 1½ Beet Loading Type. 40' Clamshell and Dragline Boom. Hercules 6 cylinder 85 H.P. engine. Fair condition — good appearance. Located Colorado. Box 1018-SS.

P&H MODEL 206, ¾-yard gasoline shovel and 38' boom dragline. Approx. weight 57,300 lbs. Located Idaho. Box 2017-SS.

⅞-YARD

BUCYRUS-ERIE—1035 GASOLINE SHOVEL. Chain Crowd. ⅞-yard Dipper. 26-in. caterpillar treads. Electric starter. Needs some repairs. Located vicinity Boston. Box 1065-SS.

BUCYRUS-ERIE—B-2—HIGH LIFT Caterpillar Mounted Steam Shovel. Good Operating condition. Located Eastern Pennsylvania. Box 1019-SS.

BUCYRUS-ERIE TYPE B-2, ⅞-YARD high lift steam shovel. Located Boston. Box 1089-SS.

BUCYRUS-ERIE TYPE B-2, ⅞-YARD high lift steam shovel. Located Lawrence, Mass. Box 1090-SS.

2—BUCYRUS-ERIE—B-2—HIGH LIFT STEAM shovels. 21'3" booms, 16' dipper handles, ⅞-yard dippers. Power boom hoists. Single shaft caterpillars. Located Massachusetts. Box 1119-SS.

BUCYRUS-ERIE—B-2—HIGH LIFT STEAM shovel. 21'3" boom, 16' dipper handle, ⅞-yard dipper. Single shaft caterpillar. Located Vermont. Box 1135-SS.

BUCYRUS-ERIE—Type B-2 Steam Shovel. Reported fair operating condition. Located near Boston. Box 1157-SS

BUCYRUS-ERIE—TYPE B-2 high lift steam shovel. 19'9" boom—16' dipper handle—⅞-yd. dipper. Cat. mounted. Reasonably good condition. Box 1175-SS

MARION MODEL 21 — ⅞ CUBIC YARD steam shovel. Caterpillar mounted. Good working condition. Located Georgia. Box 758-SS.

1-YARD

BUCYRUS-ERIE GA-2 GAS-AIR SHOVEL 22'6" boom—16' dipper handle—one yard dipper. Waukesha four cylinder 5¾"x8" engine. Overhauled approximately one year ago. Fair condition. Located Knoxville, Tennessee. Box 870-SS.

BUCYRUS-ERIE—GA-2 Gas-Air High Lift 1 yard shovel. Air starter. Single Shaft Cat. Fair condition. Located Western New York. Box 996-SS.

BUCYRUS-ERIE GA-2 COMBINATION shovel and clamshell. 24' boom. 18'4" dipper handle—1 cu. yd. cast front inserted tooth dipper. 45' boom. Complete clamshell equipment including 1 yard Williams Fav. Clamshell bucket. Air starter. Single shaft cat. Waukesha 4 cylinder 5¾"x8" gas engine. Fair operating condition. Located Eastern Pennsylvania. Box 932-SS.

BUCYRUS-ERIE GA-2 — Gas-air — high lift shovel. Good operating condition. Located Eastern Pennsylvania. Box 945-SS.

BUCYRUS-ERIE 1030 — ELECTRIC TUNNEL shovel. Boom 10 ft. 7 in. Dipper handle 10 ft. 5 in. 1-yd. dipper. Boom hoist 5 ft. 6 in. rear end clearance. 2 motor—power supply 3 phase, 60 cycle, 440 volt. Located Virginia. Box 1068-SS

BUCYRUS-ERIE—D-2 1 yard Diesel Shovel. Atlas engine. Said to be in very good condition. Located South Carolina. Box 1079-SS

BUCYRUS-ERIE GA-2 SHOVEL AND CRANE. 22 ft. 6 in. shovel boom, 16-ft. dipper handle, 1 cu. yd. cast front inserted tooth dipper, 50-ft. box type crane boom. Air starter. Good condition. Located Newark. Box 718-SS.

BUCYRUS-ERIE 31-B — 1 YARD STEAM shovel. Located Lawrence, Mass. Make an offer. Box 1092-SS.

BUCYRUS-ERIE—B-2 AIR, tunnel shovel. Boom 14'6". Dipper handle 10'9". Dipper ⅞-yard capacity. Located vicinity New York. Box 869-SS.

BUCYRUS-ERIE—GA-2 GAS AIR. Extra high-lift shovel. 24' boom, 18'4" dipper handle—1 yd. dipper. Single Shaft Caterpillar. Waukesha 4 cylinder 6¼" by 8" engine. Good working order. Will rent or sell. Located Central Illinois. Box 1103-SS.

BUCYRUS-ERIE 31-B — 1 YARD STEAM SHOVEL. Located Tennessee. Box 1093-SS.

BUCYRUS-ERIE — GA-2 — GAS-AIR — extra high lift shovel. 24' boom, 16' dipper handle, 1-yard dipper. Air starter. Mass. air tanks. Single shaft caterpillar. Located Massachusetts. Box 1121-SS.

BUCYRUS-ERIE—31-B STEAM SHOVEL. 22' boom, 15' dipper handle, 1-yard dipper. Now operating, can be demonstrated. Located Alabama. Box 1130-SS.

BUCYRUS-ERIE—Type B-2 Steam Shovel. Reasonably good condition. Located near Boston. Box 1156-SS

BUCYRUS-ERIE—30-B Electric Shovel. Suitable for power supply. 3 Phase, 60 Cycle, 440 Volt. Machine equipped with 3 motors. Said to be in first class operating condition. Located New Jersey. Box 1162-SS

BUCYRUS-ERIE GA-2 Gas-Air 1-yard shovel. Good working condition. Will rent. Located Wisconsin. Box 1199-SS.

LORAIN—MODEL 60—1-YARD shovel. Located Southern Virginia. Box 1182-SS

MARION MODEL 7, 1-yard steam shovel. Has not operated in the past five years. New flues recently installed in boiler. Located Buffalo, New York. Box 2006-SS.

MOORE—SPEED CRANE. 50' boom crane and 1-yard shovel. Gasoline. Located Mississippi Valley. Box 2012-SS.

NORTHWEST—MODEL 105—GASOLINE shovel—1-yard. Located Massachusetts. Box 1123-SS.

OSGOOD—1-YARD COMBINATION shovel—Trench hoe and 45' boom dragline. Le Roi 6-cyl. engine. Fair condition. Located Central Illinois. Box 1173-SS

P. & H. MODEL 600—1-YARD GAS SHOVEL and 40 boom clamshell. Waukesha JL-6"x7" Engine. Located North Carolina. Box 1095-SS.

P & H—MODEL 600, 1 YD. SHOVEL and dragline. Shovel boom 19'6". Dragline boom 40'. Drag bucket included. Waukesha engine. Good condition. Located Central Illinois. Box 1102-SS.

1¼-YARD

BUCYRUS-ERIE. GA-2, Gas-Air. 1¼-yard shovel. Electric starter. Waukesha W.L. 4-cylinder 6¼"x8" engine. Single shaft cat. Extensively repaired recently. Located Texas. Box 2030-SS.

BUCYRUS-ERIE—GA-2 Gas-Air High Lift Shovel. 24-ft. boom, 16-ft. dipper handle, 1¼-yard dipper. Located Virginia. Box 1063-SS.

BUCYRUS-ERIE—GA-2 Gas-Air 1¼ yd. shovel. 45' boom clamshell machine. Single Shaft Cat. Recently overhauled by owner. Located New York. Box 997-SS.

BUCYRUS-ERIE—GA-2 Gas-Air—1¼ high lift shovel. Single Shaft Cat. Electric Starter. Reported good operating condition. Located Eastern Pennsylvania. Box 998-SS.

TWO—BUCYRUS-ERIE—GA-3, GAS-AIR 1¼-yard shovels, Wisconsin D-2—6 cyl. 5¼"x6½" Engines. Good condition. St. Paul, Minnesota. Box 1097-SS.

BUCYRUS-ERIE 41-B — 1¼-YARD STEAM SHOVEL. Located near Boston. Very good price. Box 1096-SS.

BUCYRUS-ERIE—41-B—STEAM SHOVEL. 21' boom, 15' dipper handle, 1¾-cubic yard dipper. Now operating. Will demonstrate. Located Alabama. Box 1131-SS

If You Do Not Find What You Want Listed—Write Us

EXCAVATING engineer
South Milwaukee, Wis.

BUCYRUS-ERIE GA-3 Gas-Air 1¼-yard shovel. Electric starter. Steel cab. Single shaft Cat. Said to be in very good mechanical and operating condition. Located San Francisco. Box 1191-SS.

KOEHRING MODEL 501 1¼ yard gas shovel. Available about August 15. Located New Mexico. Box 879-SS.

LIMA MODEL 101. 1¼-yard gas shovel. Located Lampasas, Texas. Box 2027-SS.

LIMA MODEL 101. 1¼-yard gas shovel. Located New Braunfels, Texas. Box 2029-SS.

LIMA MODEL 101. 1¼-yard gas shovel. Located Catarina, Texas. Box 2028-SS.

LIMA—MODEL 101—GASOLINE SHOVEL. Located Maine. Box 1132-SS

LINK-BELT — MODEL K-38. Equipped with 1½-yd. Esco dipper and 50' boom dragline including bucket. Weight of machine only 82,000 lbs. Waukesha W.K. 6¾"x8" engine. Overhauled Spring 1937. Not used since. Located vicinity Spokane, Washington. Box 2015-SS.

2 MARION Model 450—Steam Shovels. Good condition. Located Connecticut. Box 1154-SS

FOR SALE

Address all box numbers c/o EXCAVATING engineer . . . . . at South Milwaukee, Wisconsin

SMALL SHOVELS
Under 2 Yards continued

SHOVEL AND DRAGLINE

MARION 450, 1¼ yard electric shovel, 23 ft. boom, 16½ ft. handle. Also 45 ft. dragline boom and ¾-yd. dragline bucket. Suitable for 3 phase 60 cycle 2300 volts. Excellent condition. Just the machine for small clay or gravel pit. Located near Chicago. Box 978-SS.

MARION TYPE 32 STEAMER. Shop No. 5676, 18-ft. boom, 15-ft. dipper handle, 1¼-cu. yd. Recently overhauled. Box 451-SS.

NORTHWEST MODEL 104, gasoline 1¼-yd. shovel and crane. Located State of Washington. Available March 1. Box 2018-SS.

OSGOOD — HEAVY DUTY — 1¼-yard Steam Shovel. Said to be in good working condition. Will sell on terms. Located Virginia. Box 1061-SS

1½-YARD

BUCYRUS-ERIE 37-B late model 1½-yd. gasoline chain crowd shovel. Excellent condition. Located Massachusetts. Box 2023-SS.

BUCYRUS-ERIE—42-B STEAM shovel. 1½-yard Vanderhoef quarry dipper. Very good mechanical condition. Can be demonstrated. Located Georgia. Box 1149-SS.

OSGOOD—VICTOR—GAS 1½ YD. SHOVEL & Clamshell. Shovel boom 23'. Clamshell boom 50'. Wisconsin D-4—6 cylinder 5¾"x6½" engine. Reported excellent condition. Located Minneapolis. Box 1111-SS.

1¾-YARD

BUCYRUS-ERIE 43-B late model 1¾-yd. chain crowd shovel. Electric starter. 1½ K.W. Kohler light plant. Buda-Lanova 6-cylinder 5¼"x7" Diesel engine. Located Central New York State. Excellent condition. Box 2019-SS.

5—MARION MODEL 37, 1¾ yard steam shovels, steel cab. Good working condition. Located Minnesota. Box 825-SS.

P&H MODEL 750, 1¾-yd. Diesel Shovel and 60' boom dragline with bucket. 1500 Watt Kohler light plant. Atlas Diesel 6-cyl. 7"x8½" engine. Located California. Box 2014-SS.

SMALL DRAGLINES
Under 2 Yards

⅜-YARD

BUCYRUS-ERIE—10-B factory rebuilt. New machine guarantee. Gasoline dragline, clamshell, shovel or drag shovel. Front-end equipment brand new. 14" Cat. treads. Electric starter. Located Western Pennsylvania. Box 1197-SD.

¾-YARD

NORTHWEST MODEL 105 GAS—40' boom dragline and clamshell, including Page "C" drag bucket. Climax engine. Reasonably good operating condition. Located Atlanta, Ga. Box 995-SD.

OSGOOD — GASOLINE — COMBINATION dragline, clamshell and shovel equipped with electric starter. 40' dragline and clamshell boom. Shovel boom 19'6" dipper handle 14'; dipper 1 yard standard and 1½ beet loading type. Fair condition, good appearance. Located Colorado. Box 1018-SD.

P&H MODEL 206, ¾-yard 38' boom gasoline dragline and shovel. Approx. weight 57,300 lbs. Located Idaho. Box 2017-SD.

⅞-YARD

BUCYRUS-ERIE—1035—40' BOOM GASOLINE dragline and clamshell, including 1-yard dragline and clamshell buckets. 26" caterpillar treads. Recently overhauled. Located Colorado. Box 1118-SD.

1-YARD

BUCYRUS-ERIE DA-2 DIESEL-AIR 40' BOOM dragline. No bucket. Atlas Diesel engine. Located Eastern Pennsylvania. Box 872-SD.

BUCYRUS-ERIE—30-B DIESEL DRAGLINE. 40' boom. 1 yd. Page "S" Drag Bucket. Atlas Diesel engine. Located Central Indiana. Box 1108-SD.

BUCYRUS-ERIE — D-2 — DIESEL DRAGLINE. Atlas engine. Located Texas. 40' Boom, 1¼ yd. Page Bucket. Field reconditioned. Available about September 15. Excellent mechanical and operating condition. Box 1020-SD.

OSGOOD—1-YARD COMBINATION shovel—45' boom dragline and trench hoe. Le Roi 6-cyl. engine. Fair condition. Located Central Illinois. Box 1173-SD

P & H MODEL 600, 1 YD. DRAGLINE and shovel. Dragline boom 40'. Shovel boom 19'6". Drag bucket included. Waukesha engine. Good condition. Located Central Illinois. Box 1102-SD.

1¼-YARD

BUCYRUS-ERIE. 34-B Diesel dragline. 45' boom. Atlas engine. Good condition. Located California. Box 2022-SD.

BYERS DRAGLINE, GAS, MODEL 125, 45' boom, 1¼-yd. Omaha bucket (as good as new). Machine in A-1 operating condition. **D. M. Crawford, P.O. Box 86, Brazil, Indiana.**

LINK-BELT — MODEL K-38. Equipped with 50' boom dragline including bucket. Also 1½-yd. Esco dipper. Weight of machine only 82,000 lbs. Waukesha W.K. 6¾"x8" engine. Overhauled Spring 1937. Not used since. Located vicinity Spokane, Washington. Box 2015-SD.

SHOVEL AND DRAGLINE

MARION 450, 45 ft. dragline boom and ¾-yd. dragline bucket. Also 1¼ yard electric shovel, 23 ft. boom, 16½ ft. handle. Suitable for 3 phase 60 cycle 2300 volts. Excellent condition. Just the machine for small clay or gravel pit. Located near Chicago. Box 978-SD.

P & H—MODEL 210—55' boom dragline including 1¼-yard Page bucket. Gas powered. Located South Dakota. Box 1172-SD

1¾-YARD

NORTHWEST. Type M—Gas Dragline. 40' plus 10' Extension Boom. 1¾-yard Omaha Bucket—nearly new. Recently put in good repair. Located Missouri. Box 1161-SD.

P&H MODEL 750, 1¾-yd. Diesel 60' boom dragline and shovel. With bucket. 1500 Watt Kohler light plant. Atlas Diesel 6-cyl. 7"x8½" engine. Located California. Box 2014-SD.

SMALL CLAMSHELLS AND CRANES
Under 2 Yards

⅜-YARD

BAY CITY—⅜-YARD GAS CLAMSHELL. Located near Boston. Box 1084-SCC.

BUCYRUS-ERIE 10-B GAS—combination clamshell, shovel and drag shovel. 14" Cat. treads. Hercules 6-cyl. engine. Good condition. Favorable price. Located Central N. Y. State. Box 2000-SCC.

BUCYRUS-ERIE—10-B factory rebuilt. New machine guarantee. Gasoline clamshell, shovel, dragline or drag shovel. Front-end equipment brand new. 14" Cat. treads. Electric starter. Located Western Pennsylvania. Box 1197-SCC.

½-YARD

BUCYRUS-ERIE — TYPE A, ½-yard steam clamshell and shovel. 26' clamshell boom. Cat. mounted. Located Central Illinois. Box 2007-SCC.

BROWNING—½-YARD GASOLINE clamshell and shovel. Clamshell boom 30' plus 10' extension. Clamshell bucket included. Good condition. Located Maine. Box 1115-SCC.

BYERS-BEARCAT gasoline combination crane, skimmer scoop and back hoe. Williams Clamshell bucket included. Located Eastern Pennsylvania. Box 957-SCC.

If You Do Not Find What You Want Listed—Write Us
EXCAVATING engineer
South Milwaukee, Wis.

GENERAL—GASOLINE ½-yard 35' boom clamshell and shovel. Located Central Illinois. Box 1187-SCC.

UNIVERSAL—THEW Model AC-35, ½-yard gasoline truck crane. 28' boom. Mack truck equipped with dual hard tires rear and pneumatic tires front. Condition good. Located Central New York State. Box 1193-SCC.

UNIVERSAL—24' BOOM TRUCK CRANE. Sterling truck. Located Central Illinois. Box 1183-SCC

¾-YARD

BUCYRUS-ERIE—TYPE B, ¾-yard, 40' boom steam clamshell and shovel. Cat. mounted. Located Buffalo, New York. Box 2005-SCC.

BUCYRUS-ERIE 1030 gasoline clamshell and shovel 35' clamshell boom and Owen "M" Model 230 clamshell bucket. 23' shovel boom. 15' dipper handle. ¾ yard dipper. Wisconsin B-3 gasoline engine. Cylinder blocks recently rebored. Machine in fair condition. Located Massachusetts. Box 982-SCC.

BUCYRUS-ERIE TYPE B STEAM combination clamshell, shovel and steam hoe. Machine completely rebuilt 1929. Good operating condition. Located near Boston. Box 517-SCC.

BUCYRUS-ERIE—TYPE B Steam clamshell and shovel. 40' clamshell boom. 19'9" shovel boom —16' dipper handle—¾-yard dipper. Also Ford truck with 500-gallon steel water tank and pump. Reported to be in good operating condition. Located New Hampshire. Box 1164-SCC.

BUCYRUS-ERIE TYPE B, steam, ¾-yard 36' boom clamshell and shovel, including ¾-yard Williams clamshell bucket. Located Central New York. Box 1188-SCC.

BUCYRUS-ERIE TYPE B CLAMSHELL and high lift steam shovel. 42' boom clamshell equipment, 19' boom, 16' dipper handle and ¾-yard dipper. Located Virginia. Box 961-SCC

NORTHWEST MODEL 105 GAS—40' boom clamshell and dragline, including Page "C" drag bucket. Climax engine. Reasonably good operating condition. Located Atlanta, Ga. Box 995-SCC

O & S MODEL "T" ¾ yard clamshell machine. 40' boom. Good working condition. Powered with Climax 5½"x7" gasoline engine. Located near St. Louis. Good working condition. Box 651-SCC.

FOR SALE

Address all box numbers c/o EXCAVATING engineer . . . . . at South Milwaukee, Wisconsin

OSGOOD — GASOLINE — COMBINATION clamshell, dragline and shovel equipped with electric starter. 40′ clamshell and dragline boom. Shovel boom 19′6″; dipper handle 14′; dipper 1 yard standard and 1½ beet loading type. Fair condition, good appearance. Located Colorado. Box 1018-SCC.

⅞-YARD

BUCYRUS-ERIE — 1035 ELECTRIC clamshell. 35′ boom. ¾ yd. Haiss Coal loading bucket. General Electric motor, 40 H.P. 3 phase. 60 cycle, 220 volt induction motor. Machine in excellent condition. Located New York. Box 1101-SCC.

BUCYRUS-ERIE—1035—40′ BOOM GASOLINE clamshell and dragline, including 1-yard clamshell and dragline buckets. 26″ caterpillar treads. Recently overhauled. Located Colorado. Box 1118-SCC.

1-YARD

BUCYRUS-ERIE GA-2 COMBINATION shovel and clamshell. 24′ boom, 18′4″ dipper handle —1 cu. yd. cast front inserted tooth dipper. 45′ boom. Complete clamshell equipment including 1 yard Williams Fav. Clamshell bucket. Air starter. Single shaft cat. Waukesha 4 cylinder 5¾″x8″ gas engine. Fair operating condition. Located Eastern Pennsylvania. Box 932-SCC.

BUCYRUS-ERIE — GA-2 — GAS-AIR 45′ Boom Clamshell Machine. Good Operating Condition. Located St. Paul, Minn. Box 1024-SCC.

BUCYRUS-ERIE GA-2 CRANE AND SHOVEL. 50-ft. box type crane boom. 22 ft. 6 in. shovel boom, 16-ft. dipper handle, 1 yard cast front inserted tooth dipper. Air starter. Good condition. Located Newark, N. J. Box 718-SCC.

BUCYRUS-ERIE — GA-2 GAS AIR Clamshell. 45′ boom. Single Shaft Caterpillar. Waukesha 4 cylinder 6¼″x8″ engine. Rebuilt since original manufacture. Good operating condition. Located New Jersey. Box 1104-SCC.

BUCYRUS-ERIE—1035—GASOLINE 40′ BOOM clamshell. Machine including 1-yard Owen clamshell bucket. Single shaft caterpillar. 24″ treads. Located Massachusetts. Box 1120-SCC.

MOORE—SPEED CRANE. 50′ boom crane and 1-yard shovel. Gasoline. Located Mississippi Valley. Box 2012-SCC.

P. & H. MODEL 600—40′ BOOM GAS clamshell and 1-yard shovel. Waukesha JL-6″x7″ Engine. Located North Carolina. Box 1095-SCC.

1¼-YARD

BUCYRUS-ERIE GA-2 Gas-Air clamshell and shovel. 45-ft. clamshell boom. 1¼-yd. shovel. Single shaft cat. Recently overhauled by owner. Located New York. Box 997-SCC.

LINK-BELT. MODEL K-2. 50′ boom gasoline crane. Also 2 extra 20′ inserts to make 90′. Weight 67,000 lbs. Located Mississippi Valley. Box 2013-SCC.

NORTHWEST MODEL 104, gasoline 1¼-yard crane and shovel. Located State of Washington. Available March 1. Box 2018-SCC.

1½-YARD

OSGOOD—VICTOR—GAS 1½ YD. clamshell & shovel. Clamshell boom 50′. Shovel boom 23′. Wisconsin D-4—6 cylinder 5¾″x6½″ engine. Reported excellent condition. Located Minneapolis. Box 1111-SCC.

LARGE SHOVELS AND DRAGLINES
2 Yards and Over

BUCYRUS-MONIGHAN MODEL 3-T, 70′ boom dragline including 3 and 5-yd. drag buckets. Equipped with 3-W walking device. Fairbanks-Morse Diesel 100 HP engine. Also Caterpillar engine to drive fan, water pump and compressor. Approx. weight 256,300 lbs. Located Idaho. Box 2016-LSD.

BUCYRUS-ERIE 50-B Diesel shovel and dragline. 2-yd. shovel dipper. 50′ boom. Located Eastern Pennsylvania. Box 2021-LSD.

BUCYRUS-ERIE 50-B steam shovel. 30′ boom 19′ dipper handle. 1¾-yd. dipper. Said to be in very good condition. Located vicinity New York Box 2002-LSD.

BUCYRUS-ERIE 50-B, 2-yd. steam shovel. Good operating condition. Located Central New York State. Box 2020-LSD.

1½-T MONIGHAN WALKER. Diesel power. 2 yard bucket, 60-foot boom. Good condition. Reasonably priced. Located Kansas. Box 742-LSD.

CLASS 320 STEAM DRAGLINE, 144-foot boom. 8-yard bucket. Located on Illinois river. A good buy. Box 750-LSD.

CLASS 230 STEAM DRAGLINE. 175-foot steel and aluminum boom. 6-yard RED ARCH bucket. Ready to work. Located near New Roads, Louisiana. Box 751-LSD.

PRICE VERY ATTRACTIVE

BUCYRUS-ERIE 50-B STEAM combination shovel and dragline, shop number 10577. 26′ boom, 17′ dipper handle, 2 yd. dipper. 50′ boom dragline equipment, 1¾ yd. Page bucket. 1 KW 32 volt Moon electric light plant. 54″x9′7″ standard coal burning locomotive-type boiler. Also 2 steel underframe flat cars on which machine is now loaded. New 1929. Moved only 250,000 yards of material. Excellent condition. Price very attractive. Located Kansas City, Mo. Deal direct with owner. Box 900-LSD.

2-T MONIGHAN WALKER, 3½-yard bucket. 70 foot boom. Good condition. Reasonably priced. Located Kansas. Box 743-LSD.

70-C BUCYRUS STEAM SHOVEL on Cats. Complete. In operating condition. Shop number 1712. Also one extra three-yard Manganese dipper and sticks. Chicago territory. Box 347-LSD.

CLASS 14 STEAM DRAGLINE, 60′ boom. 2 cubic yard Page bucket. Locomotive-type boiler. Thoroughly overhauled and ready for service. Located, Iowa. Box 771-LSD.

2—BUCYRUS-ERIE 100-B steam shovels, worked only 15 months. Also, 2 Ingersoll-Rand Diesel compressors. Very low prices for immediate sale. H. W. Nelson, 1 Wall St., New York.

TWO 3-W MONIGHAN WALKERS, 3½ yards. 70- and 77-foot booms. Good condition. Reasonably priced. Located Louisiana. Box 745-LSD.

BUCYRUS 320-B STEAM STRIPPING shovel, shop number 4205, new in 1925, used less than four years. Located at Toronto, Ohio. Box 74-LSD.

2-W MONIGHAN WALKER, 2½ yard capacity 70-foot boom. Good condition. Priced reasonably. Located Louisiana. Box 744-LSD.

BUCYRUS-ERIE 50-B Steam shovel and 45-ft. boom dragline, located Montana. Attractive price. Box 845-LSD.

P&H MODEL 900, 3½ yard Diesel Shovel, 33-foot boom, 200 h.p. Fairbanks-Morse engine. Mounted on caterpillars. Box 828-LSD.

BUCYRUS-MONIGHAN 4-W Walking dragline. 80′ boom 5½ yard Page bucket, 30′ boom insert and 4-yard bucket. Located Tennessee. Box 844-LSD.

ANY FAIR OFFER ACCEPTED

Class 24 steam dragline. 100 foot boom, 5 cubic yard buckets. Skid and roller mounted. Rebuilt 1927 at a cost of $15,000. New locomotive boiler installed 1928. Will accept any fair offer. Located near Fort Worth, Texas. Box 823-LSD.

BUCYRUS-ERIE — 55-B — DIESEL SHOVEL. 27′6″ Boom, 18′ Dipper Handle, 2½ yard Dipper. Atlas Diesel Engine. New 1935. Excellent mechanical and operating condition. Located Oregon. Box 1036-LSD.

If You Do Not Find What You Want Listed—Write Us

EXCAVATING engineer
South Milwaukee, Wisconsin

BUCYRUS-ERIE — 52-B — DIESEL 2¼ yard Shovel and Dragline. Atlas engine. Good condition. Located Eastern Pa. Box 1039-LSD.

BUCYRUS-ERIE — 100-B — STEAM SHOVEL. 3 yard Dipper. Revolving machinery, very good condition. Located Montreal, Canada. Box 1041-LSD.

BUCYRUS-MONIGHAN—MODEL 4-T — 4-yard Diesel Dragline. 110′ Boom. Good Condition. Located Nebraska. Box 1047-LSD.

MARION—MODEL 350—8 yard Electric Shovel. Power equipment, 3 Phase, 60 cycle, 2300 volt—Ward-Leonard Control. Mounted on railway trucks. Good condition. Located Minnesota. Box 1049-LSD.

MARION—MODEL 70—3½ yard Electric Shovel. Railway truck mounted. Power Equipment, 3 Phase, 60 cycle, 2300 volt. Good condition. Located Ohio. Box 1050-LSD.

PAGE—MODEL 220—2½ yard Diesel Dragline. 85′ Boom. Good operating condition. Located Iowa. Box 1052-LSD.

BUCYRUS-MONIGHAN 3-T DIESEL dragline. 80-ft. steel boom, 3 cu. yd. drag bucket. 120 h.p. Fairbanks-Morse type "YVA" engine. 1500 watt Kohler light Plant. Just completed job on Illinois River. Box 1056-LSD.

BUCYRUS-ERIE — 75-B Electric Combination Shovel and Dragline. 29-ft. shovel boom, 20-ft. dipper handle, 2½-yard dipper, 85-ft. dragline boom with mast suspension. Suitable for power supply, 3 phase, 60 cycle, 2300 volt. Induction motors. Said to be in excellent working condition. Located Eastern Pennsylvania. Box 1058-LSD.

BUCYRUS-ERIE 50-B — 2-yard Steam Shovel. Located Texas. Low Price. Box 1059-LSD

BUCYRUS-ERIE 55-B—Extra High Lift Diesel Shovel. 35-ft. boom. 22-ft. dipper handle, 2 cu. yd. Bowl Door dipper. Caterpillar mounted. Kohler light plant. Atlas Diesel engine. Used about three months. Just like new. Located Eastern Pennsylvania. Box 1069-LSD.

PAGE—MODEL 220 — Electric dragline. 90′ boom, 3½-yard Page R.C. drag bucket. Box 1124-LSD

FOR SALE

Address all box numbers c/o EXCAVATING engineer . . . . . at South Milwaukee, Wisconsin

LARGE SHOVELS AND DRAGLINES
2 Yards and Over
continued

BUCYRUS-ERIE—CLASS 24 DIESEL dragline. 130-ft. boom, 4 cu. yd. bucket. Truck mounted. 165 h.p. Anderson Diesel engine. Friction drive. Said to be in good operating condition. Located on Mississippi River near New Orleans convenient for loading on barge.
Box 1074-LSD.

BUCYRUS-ERIE—175-B TRACK MOUNTED steam shovel. 85′ boom, 58′ dipper handle, 3½-yard dipper. Good condition except dipper handle and boiler. Bargain. Located near Pittsburg, Kansas. Box 1134-LSD.

BUCYRUS-ERIE—175-B TRACK MOUNTED steam shovel. 75′ boom, 48′ dipper handle, 3½-yard dipper. Located North Dakota.
Box 1137-LSD

LOCOMOTIVES

LOCOMOTIVES

1 Baldwin Locomotive, 17x24, standard gauge, 45-ton, shop No. 33262.
2 Baldwin Locomotives, 19x26, standard gauge, 6-wheel, shop Nos. 39534 and 39536.
4 American Locomotives, 20x26, 60-ton, shop Nos. 5945, 5949, 42354 and 45323.
All of the above have passed State Boiler Inspection yearly; will stand 240 lb. cold water tests. At present are in actual service in Minnesota Mines. Box 1194-ME.

MISCELLANEOUS EQUIPMENT

We Can Build It!

A manufacturer now engaged in building heavy construction equipment is in a position to offer manufacturing, engineering and sales facilities for similar lines of machinery. Box 2033-ME.

TRACTOR DUMP WAGONS, Automatic, McCormick-Deering powered. 5-yard capacity. Either track mounted, pneumatics or steel wheels. Several new and used available at bargain prices.
Box 1174-ME

FRUEHOFF SEMI-TRAILER with 8′ by 26′ Deck. (Can be shortened). Excellent solid rubber tires. Air Brakes. 20 ton capacity. Located New York. Box 1160-ME

DRAG BUCKET

BUCYRUS-ERIE 1½-YARD Type "Y" Drag Bucket. Good condition. Located Kansas.
Box 1166-ME

DRAGLINE EQUIPMENT

72-ft. Dragline Boom and Fairlead—Hydraulic Equipment—1 Hoist Drum—1 Drag Drum—1 Boom Suspension, Sway Brace and Suspension Cables. All suitable for application to Bucyrus-Erie Model 75-B Machine. Located Eastern Pennsylvania. Box 1060-ME.

BARGAIN—NEW DIESEL COMPRESSOR ATLAS DIESEL POWERED portable air compressor, 4 cylinder, 60 H.P. engine of dustproof type, skid mounted, self contained, complete with radiator cooling system. Direct connected to a 320 cubic feet Worthington Feather Valve Compressor. Brand new and a bargain to the first comer. Atlas Imperial Diesel Engine Company, Oakland, Calif.

HAISS EXCAVATOR — C7097, June 1930. Weight 11 tons. Needs new teeth. 33″ per minute crowding. Price $1800. Box 990-ME.

CAR TRANSPORTER

CAR-TRANSPORTER or stacker with reach of 135′ and dumping height of 75′. Equipped with 4-yard aluminum car. Caterpillar-mounted and suitable for use with shovel having per hour output of 250 yards. Electric drive, 3-phase, 60-cycle, 4000-volt current. This car transporter is in excellent condition and priced to sell. Located near Kansas City, Missouri. Box 2010-ME.

SHOVEL EQUIPMENT—Late design—suitable for Bucyrus-Erie 52-B Diesel. Only handled about 4,000 yards material. Equipment located Alabama. Box 1113-ME

FOR SALE OR RENT

One Shovel attachment for No. 5 Northwest.
One Caterpillar 75 tractor with power unit.
Two 12-yard Le Tourneau scrapers.
One L.O. Allis Chalmers 80 tractor.
One ¾-yard Koehring crane with bucket.
One complete paving outfit with 27E Koehring paver.
Rouse Construction Company
Cape Girardeau, Missouri

SHOVEL FRONT ENDS

1½ CU. YD. shovel front end—new dipper—for Marion 32 steamer. Priced right. Located near Chicago. Box 857-ME.

THREE-QUARTER YARD CLASS "C" Page dragline bucket, 45′ boom with gantry and tagline weight, swing type fairlead. Adaptable to Northwest 104-105. Located Crystal Falls, Michigan. Box 1170-ME

INDUSTRIAL STEAM WRECKING DERRICK. Non-propel. Rating 50 tons at 20′ with outriggers. Located Nebraska. Box 1171-ME

BUCYRUS-ERIE—4½-YD. 4-wheel scraper. Practically new. Located Central Illinois.
Box 1177-ME

BARBER-GREENE—MODEL B-44 ditcher. Located North Carolina. Box 1180-ME

KOEHRING DRAG SHOVEL equipment for Model 301 machine. Used very little. Low price. Located Eastern New York State.
Box 1181-ME

USED CONTRACTORS EQUIPMENT

1—Model 100 Lincoln Revolver with 100′ boom and 12′ Gantry.
2—275 Koehring Mixers with Electric motors.
1—200-ton Blaw-Knox Bin with weighing batchers, cement scale and push button control.
1—Robinson Pneumatic cement unloader with silo.
1—20-ton Whitcomb Gasoline Dinkey, overhauled.
4—18-ton Steam Dinkeys, overhauled.
12—30-yd. Western Lift Door Air Dump cars.
12—30-yd. Koppel Drop Door Air Dump cars.
26—16-yd. K. & J. Lift Door Air Dump cars.
6—20-yd. K. & J. Lift Door Air Dump cars.
5—2-cu. yd. Blaw-Knox Roller gate Concrete Buckets.
7—70-ton 20x36 Baldwin Switchers.
1500 tons used steel sheet piling—Sections M-111, M-112 and M-115 35 to 50′ lengths.
3—Jordan spreaders excellent condition.
Located Mississippi valley. Box 2011-ME.

DRAG SHOVEL EQUIPMENT—consisting of 18′ boom, 7′6″ dipper handle and ½-yd. front-opening dipper suitable for application to Bucyrus-Erie 1020 shovel. Located Rhode Island. Box 2003-ME.

EUCLID-TUWAY 11-CU. YD. dump wagon. Hydraulic hoist. Worked only 320 hours. Located Central New York State. Box 1189-ME.

ERIE AGGREMETER BIN—80-ton capacity with 3 compartments, including weighing scales. Only handled 10,000 tons. Located Central New York State. Box 1190-ME.

MINING AND QUARRY EQUIPMENT

The following equipment is located in Minnesota. Full details on request.

3—Boilers.
12—36″ gauge Koppel double truck flat cars.
6—36″ gauge Peteler 4-yard two way dump cars.
4—Swing & Boom engines for Marion 31 & 36 shovels.
1—Austin-Western grader, 8′ blade and scarifier.
4—Hoists—Single and double drum.
2—Milwaukee gasoline locomotives, 7-ton 24″ gauge.
3—Electric motors, 100 to 150 h.p.
8—Pumps—Steam and gasoline.
1—Special Twin City Tractor.
1—Complete Ainley Placer gold machine.
Box 833-ME.

CONCRETE VIBRATOR
with grinding attachment.

MASTER VIBRATOR, powered with a 3 h.p. Wisconsin engine and equipped with 20′ of hose and grinding attachment. Practically new, used on less than 200 cubic yards of concrete. Will take $450 for entire outfit, f.o.b. Mobile, Ala. Here is a pick-up for someone at this price. Box 1125-ME

USED EQUIPMENT FOR SALE

1—50-B Bucyrus Steam Shovel, Caterpillar
1—American Locomotive Crane, mounted on 4 wheels
Pile Driver attachment and Drag Line
66 ft. Leads
5 ton Steam Hammer (No. 1 Warrington Vulcan Steam with standard base)
Two pieces of cast slab ballast
1—15-ton Plymouth Gasoline Locomotive
1—7-ton Plymouth Narrow Gauge gasoline locomotive
1—3½-ton Plymouth Narrow Gauge gasoline locomotive
1—2-yd. clamshell bucket for handling materials
1—¾-yd. Page dragline bucket
1—¾-yd. Owen clamshell bucket
1—½-yd. Owen clamshell digging bucket
1—No. 8 Adams leaning wheel grader
1—No. 30 Caterpillar gasoline tractor.
1—No. 28E Rex Paver
1—No. 21E Rex Paver
1—7S Lakewood Mixer
1—Butler Bin with automatic weighing hopper, 36 cu. yds.
1—2″ Triplex Domestic road pump
1—Band Saw Table
1—Saw table
Other Miscellaneous Small Tools and Equipment.

WILLIAM E. LENNANE
8717 Arcadia Avenue Detroit, Mich.

WANTED

WANTED: 3-yard Monighan dragline for parts.
Box 2009-ME.

WANTED: Fairleads for ¾-yard Koehring Crane. Box 2008-ME.

WANTED TO BUY: One shovel attachment complete for ⅜-yard Model 32 Hanson excavator; or will trade complete dragline attachment and bucket for shovel attachment.
Box 2004-ME.

WANTED: Bucyrus steam crane Model 41 or 42. State full particulars. Box 2032-ME.

WANTED, to rent: 1-yd. or 1¼-yard shovel, to be used in Central Arkansas. Gasoline or Diesel. Might buy. Box 2031-ME.

WANTED: 2 semi-trailer platform shovel carriers, with or without tractor, 40-ton capacity. One semi-trailer I-beam shovel carrier, 60-ton capacity. State condition, location for inspection and best cash price. Box 2034-ME.